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REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1880. — 1886



HALIFAX, N. S.
ROBERT T. MURRAY, QUEEN'S PRINTER.
1881.

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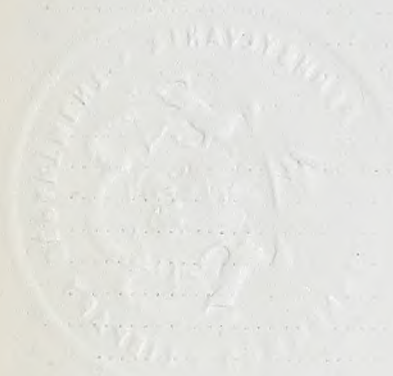
Silver

ERRATUM.

In the Table of Coal Sales, page I, the total sales in Nova Scotia for the year 1880, should read 352,913, instead of 322,913.

ALABAMA

YOUNG STATE



DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1880.

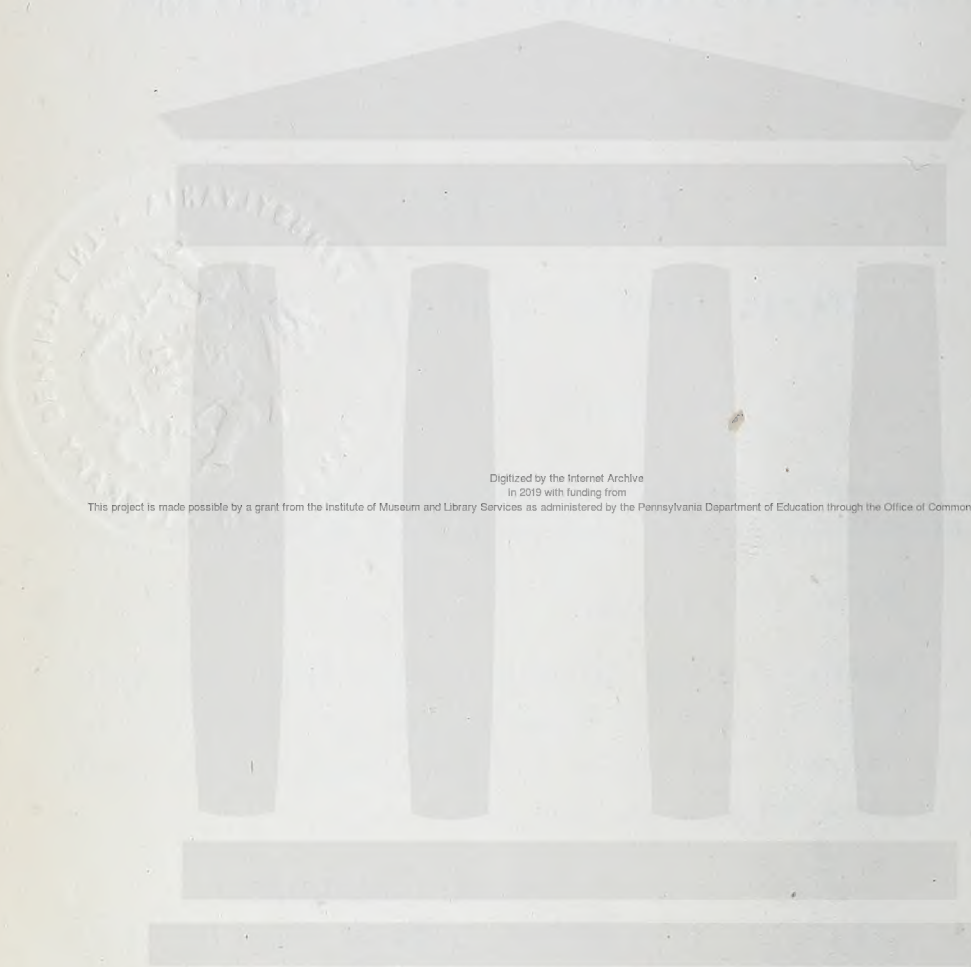
*To His Honor the Honorable ADAMS GEORGE ARCHIBALD, C. M. G.,
Lieut.-Governor of the Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR:—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled from official and other returns made to the Department of Mines, in the year 1880.

SAML. CREELMAN,
Commissioner of Public Works and Mines.

HALIFAX, February 25th, 1881.



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REPORT

ON THE

MINES OF NOVA SCOTIA.

BY EDWIN GILPIN, JR., A. M., F. G. S.,
MEMBER OF THE NORTH OF ENGLAND INSTITUTE OF MINING ENGINEERS.

OFFICE OF INSPECTOR OF MINES,
HALIFAX, Feb. 20th, 1881.

THE HON. SAMUEL CREELMAN, M.L.C., M.E.C.,
Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following Report on the various mining industries of the Province, carried on during the past year.

In addition to a detailed notice of the operations at each mine, and the usual statistical tables, I submit a summary of the amount of minerals exported which do not pay Royalty to the Government of Nova Scotia.

The following summary shows, so far as I have been able to learn, the extent of the mineral production of Nova Scotia during 1880, compared with that of the previous year:—

	1879.	1880.
Gold	Ounces 13,801	13,234
Iron Ore	Tons. 29,889	51,193
Manganese Ore	" 145	223
* Coal raised	" 788,273	1,032,710
† Gypsum	" 95,126	128,528
† Building Stone	" 5,562	3,540
† Barytes	" 480	.....
† Limestone	" 9,444	11,773
§ Coke made	" 9,646	13,125
Fireclay	" 50	75
Grindstones, etc	" 1,675	1,500

Through the kindness of the Collectors of Customs, at the ports specified, I am enabled to give further details under this head.

* Tons of 2,240 lbs.

† Quantities shipped. Amount used in Nova Scotia unknown:

‡ For Iron smelting.

§ Exclusive of Coke made at Londonderry Iron Works.

COAL TRADE.

The total sales for the year 1880, amount to 954,659 tons, being an increase over the sales of 1879, of 266,035 tons, and form the largest sales yet recorded.

The most noticeable points in the trade were an increase of 74,793 tons in the home sales, an increase in the sales to Quebec and Ontario from 154,118 tons in 1879, to 239,091 tons in 1880.

The sales to New Brunswick, Newfoundland, Prince Edward Island, the West Indies and Europe all show decided increases.

The trade to the United States rose from 51,641 tons in 1879, to 123,423 tons in 1880, forming the largest export to that country since 1874.

CUMBERLAND COUNTY.

The total trade of this County amounted to 134,671 tons against 90,671 tons in 1879. The home sales increased from 19,121 tons in 1879, to 31,498 tons during the past year. The Quebec trade shows an increase of 24,663 tons. The amount sent to New Brunswick is 5,547 tons in excess of the sales of 1879.

COLLIERIES.

JOGGINS.—During the present year the slopes have been sunk 130 feet, and new levels driven about 600 feet east and west. The pillar work has been continued satisfactorily. A new ten inch force pump, built by the Yarmouth Iron Works, has been put in and found to work well. A new cylinder has also been put in the winding engine. A coal shed was built for storing nut coal, and the loading shoot thoroughly repaired.

SCOTIA.—A few tons were extracted during the first and last quarters of the year.

CHIGNECTO.—The level was continued, and a few bords driven to the rise. The coal has improved as the cover increased.

STYLES.—During the winter a shaft was sunk on this seam, on the brook near the mill, and several openings made on its westward extension. This and the associated seams will soon be opened, it is to be hoped, in the present encouraging state of trade.

SPRING HILL.—The extraction of pillars in the east side of the North Seam has been continued during the summer, and levels have been driven about 400 yards into the new area, and three counter balances driven. The pillars of this seam on the west side are being taken out, except under the brook, etc. The east tunnel to the South Seam has been completed, and levels driven 300 feet east. A balance has been driven, and a return will be made in the level of the old workings. The extraction of pillars has been continued in the South Seam, on both levels. During the winter a large furnace will be put up at the crop, on a line with the face of North Seam workings, and it is proposed to put up a furnace near the East Slope. This will bring the ventilating power well into the new winnings, and give an ample supply of fresh air.

The railway track was improved and straightened, and fresh arrangements made for the supply of pure feed water. New boilers were put in, and the boiler shed extended, and several new dwelling houses were built.

During the season but little prospecting was done in this County; a six foot seam, however, was found about three miles west of Spring Hill. This discovery was made in the district referred to by me in my report on Nova Scotia Minerals as likely to yield coal on a careful search.

The following analysis of the coal on the Black River is from the last report of the Canadian Geological Survey:—

	Slow Coking.	Fast Coking.
Hygroscopic Moisture.....	3.73	3.73
Volatile Comb. Matter	28.01	34.33
Fixed Carbon.....	54.28	47.96
Ash	13.98	13.98
	<hr/> 100.00	<hr/> 100.00

The coal is very similar to that from the Styles mine.

PICTOU COUNTY.

The trade of this County has increased during the past year, the returns showing that 434,922 tons of coal were sold, an increase of 104,044 tons over the sales of 1879.

This production would have been still larger, had the operations of the Albion Colliery not been suspended since November 12th.

The most noticeable feature in the trade of the County have been a decided increase in the home sales, and an increase of 38,270 tons in the quantity sent to Quebec and Ontario.

The sales to the United States rose from 15,597 tons in 1879 to 38,265 tons during the period under review. The trade to the Maritime Colonies also shows an increase.

COLLIERIES.

ACADIA.—During the past year the winning places in the fifth lift have been steadily continued, and are now in for three working balances on each side. All precautions are taken against gas, and the air in the dip workings in June was about 20.000 feet. The extraction of pillars in the upper level has been carried on successfully.

A coal washer has been put up, which has been very satisfactorily used for washing the slack coal. During the latter part of the year the practice of using slack coal for the engines was abandoned, and a return made to round coal.

The Muesseler lamp, which is believed by many mining authorities to be better than any now used, has been introduced at this Colliery. I give details of its properties, etc., further on in the report.

ALBION MINES.—*Main Seam*.—During the past year the work of extending the dip slants was carried on, and a holing made on the north side, between the slant and the level face. Work was carried on in the rise bords on both sides of the pit. A very fine set of air compressors, boilers, underground engines, pipes, etc., was brought out from England and partly set up.

Deep Seam.—No work has been done in the winning in this seam from the stone drifts. The workings in the Cage pit dips have been largely extended, and several balances have been opened. Telephones were put up, connecting the office with the underground workings, wharves, etc.

Operations at these mines were suspended by an explosion causing heavy loss of life on November 12th. It was hoped that the effects of the explosion would have been confined to the Foord pit, but when attempts were made to re-enter the Cage pit, it was found to be on fire close to the shaft. The pits were sealed, and a Gurney furnace set up to inject carbonic acid; this has had the effect of lowering the temperature of the workings, and it is hoped that it may finally extinguish the fire. The origin of the fire has been attributed to the blast in the Foord pit extending through the stone drifts; but there were many things observed which led to a doubt as to this having been the cause.

At the close of the year the drawing shaft at the Foord pit had been cleaned out down to the water, which had risen three hundred feet in it, and preparations were being made to extract the water. The loss inflicted on the district, and indeed the whole Province, by this sad accident, is a very heavy one, as the expenditures of the company were on a large scale, and honorably conducted. The sympathies of the Province and of the Dominion have been shown by a large subscription made for the widows and children of the men who were lost, and much regret has been expressed for the unexpected interruption and heavy loss inflicted on the company, at a time when the future of their operations appeared to be most securely determined by an improvement in the coal trade, and by their having finally put their workings in such a shape that an immense area of coal could be worked for many years without increasing their expenditures for new winnings, etc.

Further details relative to the explosion will be found under the heading of accidents.

Toward the close of the year, trial openings were made on the Third and McGregor Seams, and they were found to be well adapted for coke making. The coal from the Third Seam is suited for all the uses to which that from the Main and Deep seams has hitherto been applied.

INTERCOLONIAL.—Work has been continued steadily at this mine; the levels have been extended, and new balances driven. Pillars have been extracted on the west side. The coal beyond the step has been opened out successfully. The slopes have been extended for a new lift. A full set of telephonic communication has been set up between the works and to the loading wharf. New frictional gearing has been introduced for the winding engines. The railway has been straightened, and the grades improved at several points.

VALE.—During the past season the levels of the new winning have been considerably extended, and the working places have been continued. The extraction of pillars has been continued in the upper lift, with the precaution of using safety lamps, etc. During the fall it was found necessary to fine three men working in the pillars, who were detected using open lights where safety lamps were required. The small engine has been removed to the lower lift, to be ready for further sinking. A telephone has been built, connecting the mine, office and wharf. The building for the new Guibal fan has been completed. It is of stone, and built in a very substantial manner. An opening was made in the six foot seam, about half a mile to the westward of the Colliery, and the coal proved to be of good quality.

CAPE BRETON COUNTY.

The sales of coal from this County amounted to 380,848 tons, an increase of 117,924 tons over the preceding year. The home sales increased 21,449 tons. The sales to Quebec increased 22,522 tons. There was also a notable impetus in the trade to the United States, the sales being 83,032 tons, against 36,044 tons in 1879. There has been a general increase in the sales to all points usually reached by Cape Breton coal.

COLLIERIES.

SYDNEY.—The workings of this Colliery have been continued to the rise in the south side levels, and on the dip slants. The erection of the Guibal fan, the dimensions of which were given in last year's report, has been completed. It stands about twenty feet from the shaft, and is cased in wood. It is furnished with an indicator, showing the number of revolutions made. This is a very useful check on the Engineman, etc., and prevents the possibility of any slackening of its speed escaping notice. It is to be hoped that the example of me-

chanical ventilation set by the Sydney Mines will be followed by the other operators in this County.

LINGAN.—During the past year the south side levels were extended and new bords broken off. As the workings approach the water a large barrier is left along the shore. The extraction of pillars was continued to the dip of the south level. Some coal was also taken from the north side workings. A small engine was put up to furnish power in the shops, etc.

A new pump has been erected for lifting the top water from No. 2 level up to No. 1 level, whence it runs to the shore. Its dimensions are as follows: Steam cylinder, 18 inches; water cylinder, 7 inches; stroke, 4 feet. The pump formerly in use at this point has been transferred to No. 4 level.

RESERVE.—During the past year the operations of this Colliery have been on a more extended scale. The No. 3 and No. 4 levels were extended on the north side, and No. 4 level on the south side. Arrangements were made for the commencement of pillar work. The coal raised was shipped at Sydney, but during the winter a few cargoes were sent from Louisburg. This mine, together with the other property of the Cape Breton Company, is now operated by the Sydney and Louisburg Coal and R. R. Company, with D. S. Kennelly, Esq., as agent.

INTERNATIONAL.—The repairs to the engines, etc., were continued, and the road bed of the railway put in good order. The operations of the preceding season were continued briskly, and an output of 63,131 tons reached. New tubs of an improved pattern were introduced, their capacity being 32 cubic feet.

LITTLE GLACE BAY.—During 1880 the usual system of working was continued. New bords were opened in the north level and to the rise. The air circulating in June amounted to 15,000 cubic feet per minute. One of the Dominion dredges was employed during the summer in deepening the channel to the dock, to admit vessels drawing 21 feet of water.

CALEDONIA.—Operations have been continued on the south side; the removal of pillars immediately to the rise of the pit has been carried out successfully. The rise bords have also been continued toward the west end of the level. The old lake adit has been continued into the workings for the purpose of draining the surface water. Work on the north side of the pit has been discontinued for the present.

ONTARIO.—Operations at this mine have been on a comparatively small scale during 1880. The bords have been extended to the westward. Repairs were made in the trestle work leading to Port Caledonia.

BLOCK HOUSE.—The rise bords have been continued on the north side of the workings, but the coal has been taken principally from the pillars extending to the north-west or land end of the basin. The output was 48,475 tons against 27,509 tons in 1879.

GOWRIE.—The workings have been considerably extended on the upper level, and pillars have been taken out on the lower level beyond the foot of the incline. The air found circulating on the upper level in July amounted to 10,000 cubic feet per minute. Repairs were made on the shipping wharf and dwellings. The output of this colliery is double that of the preceding season.

OTHER COUNTIES.

BROAD COVE.—But little work has been done here during the past season. The shipping wharf referred to in my last report was damaged by a heavy storm.

NEW CAMPBELLTON.—The levels have been continued to the north, and the first panel of long wall work completed. The second is now in course of extraction. The wharf has been protected by hard-wood sheathing. An opening has been made on a bed of coal, considered the extension of the 6 foot seam, into a locality admitting of a favorable chance for opening it.

GOLD MINING.

GENERAL REMARKS.

The total yield of gold during 1880 was 13,234 ounces, against 13,801 ounces in 1879. This yield would have been much larger but for the depression which existed at Sherbrooke, (the output of which district has decreased fifty per cent.,) and the stoppage for several months of the Rose mine. Apart from the lessened yield at Sherbrooke, the promise for the year 1881 is unusually good, as extensive preparatory works have been carried on at a number of districts.

This lessened production is also partly due to the fact that many of the mines were stopped, or worked to a small extent only, as the proprietors anticipated changes in the ownership. A large amount of prospecting has been carried on and numerous discoveries made, which promise well for the year 1881. Among these districts may be mentioned Mosher's River, Salmon River, Fifteen Mile Stream, and Yarmouth. The tribute system is still continued in our gold fields. This style of working, when properly conducted in mines opened in a systematic and workmanlike manner, is a valuable adjunct to metalliferous mining, as it offers premiums alike to masters and men. As conducted in this Province, however, it gives results which are injurious to the future of gold mining. The letting of lodes to men without capital for short periods results only in small crop excavations on the richer parts of lodes; these workings are in too many cases insufficiently timbered (*i. e.*, in view of permanent workings), and cause much trouble to those succeeding them.

Several valuable properties have been transferred to capitalists, who have found their investments profitable. During the coming season it is expected that an increased amount will be invested, and this is entirely due to an unbiased opinion as to the richness of our lodes, formed by practical mining engineers, who are acquainted with the auriferous districts of other countries. These men are investing their own money in our gold fields, which fact, as it becomes known, will induce greater confidence in the investments of the general public. Investments, however, by those personally unacquainted with mining should be made only on the authority of well known men of proved integrity and ability, or the unfortunate adventures of our early gold mining will be repeated.

DISTRICTS.

CARRIBOU.—At Carribou the most successful mining was on the Free Claim lode by the Messrs. McDonald, who sank about 50 feet deeper and stoped to the eastward on area 474. The Touquoy flat lode was worked for some time on the west of the road. Prospecting was done by Mr. Touquoy and others, but the most work was done at the Moose River Mines. Here Mr. Cole worked the Little South and the Sutherland North lodes, sinking two shafts and stoping east and west from them. Messrs. Walton and Mr. Dunbrack worked on an angling lode on area 131 and those adjoining, which showed much free gold. Taylor and others worked on a lode presenting the form of an anticlinal fold dipping to the east, with a subordinate synclinal fold at the apex, with a thickness varying from one quarter of an inch to three inches, and having a parallel smaller lode a few inches below. A flat lode, dipping north, was worked by Mr. Sutherland on the east side of the road, and late in the fall Messrs. Foster and Cole re-opened the Comstock lode. Promising discoveries were made by Mr. Zwicker about one mile to the westward, and this district will be thoroughly prospected during the summer.

This district, so far as opened, promises well for the future, and it would receive more attention were the present means of access improved to a passable road.

FIFTEEN MILE STREAM.—Work has been confined principally to the property of the Messrs. Hall. They have opened about 200 feet of the lode found during the preceding summer. Some 191 tons have been crushed, and yielded 558 oz. 19 dwt. 10 grs., at the rate of 2 oz. 18 dwt. per ton. They have also opened five adjoining lodes, all of which are considered of good milling value. The largest, known as the Orion lode, is, including several inches of slate, about 45 inches thick. The mill has been repaired and runs two batteries of five stamps. The district still remains without a regular road, and this greatly increases the cost of working and of transport of supplies.

LAWRENCETOWN.—But little work was done in this district. Prospecting was done to the east of the Westminster property, and beside the Stillwater. A search was also made for the so-called Boulder lode, and will be continued next year. A few trial lots from various localities were crushed by Mr. Crook.

GAYS' RIVER.—This district has also been neglected. A little work was done on areas 3 and 4 by Mr. D. A. McDonald.

MONTAGU.—Work has been successfully carried on at this place during the period under review. Operations on the Rose lode were successfully prosecuted during the summer, until in the fall a break was met which passed so much water that the mine was flooded. A delay was caused by the necessity of procuring pumping machinery of larger capacity, and the mine has been again freed from water. During the stoppage the eastward extension of the lode was opened, and a second pay chimney found equal in richness to that first opened.

The Symonds property has been steadily worked; a fresh opening was made about 2,000 feet west of the mill, and the lode proved equally rich.

A large quantity of low grade quartz was raised from the DeWolf property, and crushed at the Rose mill.

The Temple area was prospected by a shaft sunk by Mr. Stewart, and at a depth of 100 feet the lode, an extension of that worked by the Rose Co., promised well. For some distance from the surface it was about one inch in thickness, but at the depth mentioned it had resumed its normal dimensions, and may be cited as an instance of the importance of thoroughly testing lodes.

On the 15th Range several tons of quartz were mined and crushed, and a little work was done to the south of the Rose lode, and at a few other points.

Work was done by Mr. W. D. Sutherland on areas lying immediately west of the Temple area, and several promising lodes opened, also on an area adjoining the Free claim, and on area 1355.

The total yield of the district during the past season has been 1,222 tons of quartz, yielding 4,270 oz. 8 grs. 17 dwts., almost all of which came from the Symonds and Rose property.

WAVERLEY.—Although the yield of gold from this locality is small, the indications are that next year this district will make a return towards its former productiveness.

On the Burkner area a lode was opened by tributors, who stoped some 180 feet to a depth of 30 feet. Mr. McClure found to the west of his mill a 15 inch lode, which promises well from the trial crushing, which ran as high as $1\frac{1}{4}$ oz. to the ton. Preparations have been made for its thorough development. Another lode, lying a short distance south of this one, has been proved to be of a promising character.

A little prospecting has been done in East Waverley, and at a few other points in the district. A mill for re-grinding tailings was put up during the summer, but work was suspended in the fall.

OLDHAM.—Work was carried on by Messrs. Doyle and McDonald in an angling lode on the Sterling and adjoining properties. Work was also continued by the Messrs. Donaldson. The Baker area furnished a large amount of quartz from a three foot lode, which averaged about 8 dwts., and was conveniently situated for mining and milling. Small lots of quartz were taken out on other properties at various times through the summer.

RENFREW.—But little work was done here during the summer. In the fall Mr. McDonald was reported to have found a lode which warranted working. The Hartford property was re-opened, and the necessary machinery procured for pumping, hoisting, etc.

SHERBROOKE.—The yield from this district has fallen off very much during the past year, it being only 6,465 tons, yielding 4,042 oz. 7 dwt. 9 grs., an average of 12 dwts. 10 grs. per ton, against 9,209 tons, yielding 7,389 oz. 17 dwts. 15 grs., in 1879.

Operations on the Wellington area have kept up their usual steady course. The main shaft in the Dewar lode was sunk 550 feet, and

three levels carried west to the pay streak, running from three to five ounces. A new engine was put up of larger capacity than the one hitherto in use. A four-inch lode lying to the south was tested, and a shaft sunk 100 feet on the Murray lode, lying north of the Dewar.

Work ceased on the Grapevine in May, but an opening was made from it into the adjoining area by a company, in search of a rich pay streak.

A good deal of work was done on the New York, Hadyn & Derby, Rochester, Kingston and other properties.

On the Dominion area, Messrs. Bent and Fraser took out an additional ten feet beside the lode they worked during the preceding year, making the total width of ground fifteen feet, the greater part of which was sent to the mill.

Work was continued at Cochran's Hill, in the same class of quartz as that noticed in my last report.

STORMONT.—Work was continued by Mr. Gallagher on the north lode, the quartz, which was crushed at Sherbrooke, yielding at the rate of nearly two ounces to the ton. A large company is being organized to work some promising areas in this district next summer.

A little quartz was mined at Country Harbor Narrows.

TANGIER.—Mr. Townsend continued working on the Forrest and Dunbrack lodes, and in the fall found a rich chimney in the Forrest lode, a few yards east of the Mooseland road.

Mr. Barton worked during the early part of the year on the Blue lode. But on the discovery of the Nugget lode he transferred his operations to it, and the results have been of a very satisfactory character.

The Pittsburg Company have been engaged in opening the Field lode over an area of 1,850 feet, by four shafts. They have also erected a first-class mill on the west side of the river, driven by water power taken off the river about 3,000 feet away. The mill, which is provided with Blake crusher, automatic feeder, etc., has two batteries of five stamps each. The stamps weigh 750 lbs., and are run at 90 drops. A magazine and other necessary buildings have been erected, and all preparations have been made for a steady winter's work.

UNIACKE.—Work has been continued steadily during the year. On the Montreal area the Bunker, Mitchell and McPhail lodes have been worked, in places by stoping from shafts, at other points by open cut. Mr. Prince continued working the lode west of the mill, and stoped about 100 feet to the east, and to a depth of 120 feet.

Work was carried on in the West Lake and other properties, and also by Mr. Davidson. The latter erected a new water mill about half a mile to the north of the present workings, and crushed for a number of parties during the summer.

WINE HARBOR.—Mining has not been briskly carried on here during the year. W. May was engaged in taking old blocks out of the Plough lode, etc., and some prospecting was done on the Barrens. A promising lode was found on the Henry area, and some work done on it. The other work performed during the year was of a desultory character.

OTHER DISTRICTS.

A good deal of activity was shown at a number of places, and lodes have been discovered, which promise to be of unusual value.

At Ecum Secum the Pittsburg Company were engaged in preparing for opening the slate leads of the Atlantic property. Messrs. Campbell and Smith were engaged during the summer in putting up a mill, opening lodes, etc., at Shiers Point.

At Harrigan's Cove, Mr. Mott did some work in the early part of the season, on the South and Snake lodes, which yielded well. Mr. Mott then turned his attention to Salmon River, where a large and valuable lode of 30 to 40 inches in width was found. About 100 tons of quartz have been extracted for treatment at his mill at Harrigan's Cove.

Among other localities at which work has been done may be mentioned Yarmouth, where a new mill has been erected; Moser's River; Beaver Dam, from which place a few tons were taken and crushed at Caribou. A little work was done at Upper Stewiacke, but the mill was burned during the summer, and operations discontinued. Work was also done at Gold River, and preparations made for erecting a mill, and it is proposed next summer to work one of the large lodes at Indian Path.

Discoveries of gold-bearing quartz were reported from Berwick, South Mountain, Halifax City, Cobequid Mountains, Birch Cove, Hammond's Plains, Preston, Porter's Lake, Chezzetcook, Portobello, Tusket, Lahave, Salmon River, Guysboro County, and Middlefield, Queen's County; and a considerable amount of prospecting done, which has in some cases disclosed lodes believed to be valuable.

COPPER, SILVER, LEAD, ETC.

During the past season a shaft has been sunk on the Eagle Head Copper ore of Gabarus Bay to a depth of 75 feet, and a cross-cut driven. A considerable quantity of ore has been taken out, which the proprietors purpose sending to England.

A little prospecting has been carried on at various points, among which may be mentioned Malagash, Cumberland County, where the grey and green ores occur, River Denis, Cheticamp, and the West River of Pictou. The Cheticamp ore is stated to carry considerable percentages of gold and silver.

Much interest was manifested during the summer over discoveries of silver ore in Musquodoboit; assays were said to show values in silver as high as \$100 to the ton. A number of licenses were taken out in this locality, and on the St. Mary's and Salmon Rivers. Prospecting was carried on during the fall, and will be renewed in the spring. The proprietors are sanguine as to the value of their areas, the successful development of which will materially add to the mineral wealth of the Province.

Prospecting was also carried on at the Sugar Loaf Mountain of the Cobequids, on a vein stated to show, on assay, very favorable amounts of gold, silver, and copper. Promising indications are reported from the Tusket River, Arichat, and Chegogin, and the vein of argentiferous galena on the St. Mary's River, opened some years ago, was tested again.

The presence of *Nickel* and *Cobalt* in the pyrites of our gold fields, etc., should not be overlooked. In samples from Musquodoboit and St. Mary's, which have come under my notice, these metals have been present in quantities up to 3 per cent. Cobalt ores running 5 per cent., are worth about \$150 per ton.

Several deposits of *Plumbago* have been found in Musquodoboit, Guysboro, and Cape Breton Counties, but I am not aware of any work having been done to test their extent and value. With reference to this mineral, it should be remembered that purity is not the only requisite for its adaptability for purposes requiring the better grades. Thus a disseminated graphite, similar to that generally met in this Province, from the vicinity of St. John, N. B., was, as far as purity was concerned, of very high class, holding only .16 of ash; but on practical testing it appeared that its state of aggregation would permit of its use only for the commoner applications. Those who are interested in such deposits in this Province will see that the assay values alone of the mineral are not a sufficient test.

MANGANESE.—During the past summer the mines of J. W. Stephens, Esq., at Tenny Cape, were worked to a considerable extent, and some very fine ore taken out. The William Stephens mine, about one-half mile north, was opened with good promise of success. A trial cargo of “hard” manganese was shipped from Cheverie to Boston. A few barrels were reported as having been mined at Onslow, and the occurrence of good ore was reported from Loch Lomond, in Cape Breton County.

In connection with the occasional discoveries of *Tin Ore* that have been made in this Province, it is interesting to notice that Professor Hitchcock has examined a deposit of tin ore in the State of Maine, on the Kennebec, a few miles above the State capital. He pronounced the gangue and country rock “identical with those common to the stanniferous districts of Europe, and reported the indications sufficiently promising to warrant a thorough test.” Work has been commenced, and carried on up to date with satisfactory results.

IRON MINING.

The Steel Company of Canada have continued their operations during the past year, and reached an output of 50,696 tons of iron ore against 29,889 tons mined in 1879. There were also 4,773 tons of ankerite quarried for flux. Iron ore was also supplied to the company from Clifton, Colchester County.

The operations of the company were continued at both their mines, and the ore on the west side of the Cumberland brook opened. The ore on Cook's Brook was also tested.

At Clifton, Mr. A. McDonald has opened on a 7 feet vein of red and brown hematite, and sent 497 tons to Truro, for the Steel Company, as mentioned above.

At Upper Stewiacke a little prospecting was done on a deposit of brown hematite, said to be of large extent. Specular iron ores were tested at Marshy Hope, Guysboro, and some prospecting work was done on the East River of Pictou by H. S. Poole, Esq.

Discoveries of limonite were reported from Rawdon. Practical tests of the red hematite ores of French Vale, belonging to the Hon. E. T. Moseley, and of Smith's Brook, belonging to Mr. Burchell, have shown that they are of excellent quality, the metallic yields being respectively 57 and 56 per cent., with very little deleterious matter.

FIRE CLAY, ETC.

CEMENT.—Mr. Fletcher, of Truro, is stated to have found near Polly Bog a natural hydraulic cement of good quality. At present the local demand for this article is supplied by the English Portland Cement, and by a very good natural cement from Quebec.

FIRE CLAY.—Further progress has been made in the development of this important article. Messrs. McIntosh and Dewar, of Stellarton, have made exhaustive tests of all the clays of Pictou County, and find the clay underlying the McGregor seam the best. The sand used is from Antigonish. A set of kilns, crushers, etc., have been put up, driven by a 25 horse-power engine from W. Fraser & Sons, New Glasgow. The plant, which is on the pattern of the Blaydon Burn and Pelton Brick Works, England, is capable of meeting the requirements of the Province in this line for some time to come.

PETROLEUM.

Much interest was manifested last year in the "oil fields" of Cape Breton. Indications of the presence of petroleum in Cape Breton were brought into public notice as far back as 1864, and shortly after the Pioneer Oil and Salt Company bored two holes to a depth of about 600 feet on the McIsaac farm, near Lake Ainslie. The indications were said to have been unusually promising, but the holes were lost, and work ceased for want of funds.

During 1879 and 1880 large tracts of land in Victoria and Inverness counties were carefully examined, and the following indications of the presence of petroleum observed:

That globules of heavy dark petroleum were seen rising through the waters of Lake Ainslie and spreading over the surface; that the rocks on the shore were in many places saturated with it, and this saturation was observed for several miles. Swamps were frequently found to be covered with oil, and many springs were so impregnated with it as to be unfit for domestic use. Gas was also observed issuing from fissures in the rocks at many places.

These indications prevail over a district from five to seven miles wide, extending from the Margaree district, down through Lake Ainslie, Skye Glen, and the River Denis Basin. Similar indications are observed at the Middle and Baddeck rivers. The Victoria Oil Company have put a six-inch hole down near Baddeck to a depth of about 500 feet, and claim to have struck promising rock. This company are prepared to test the district thoroughly, and to put down two more holes during the coming season.

In the Lake Ainslie district seven wells have been put down on the western shore, some two or three miles south of Lough Ban. Among the bore-holes may be mentioned that of the Cape Breton Oil and Mining Company, which has reached a depth of 1100 feet, and is claimed to have reached the "third sand rock" at a depth of about 1000 feet.

Considerable quantities of oil have been secured and barrelled for testing in the States. At present the quantity of salt water in the strata has caused a delay, and necessitated fresh pumping appliances. The oil is stated to give the following results:—gravity, 22.5; flash test, 390°; fire test, 440°; it was found to be limpid at zero, and in the crude state to be equal to any manufactured lubricant.

Professor Richards of the Massachusetts Institute of Technology carefully examined the district during the past summer, and in his report unhesitatingly states his belief in its value as an oil producer. The following companies are now at work:—The Cape Breton Oil

and Mining Company; the Inverness Oil and Land; the American Oil and the Victoria Oil Companies. I am informed that four more companies purpose procuring charters from the Provincial Parliament.

It will thus be seen that already an important step has been taken toward the testing of these districts, and the coming summer will see an increased number of bore-holes put down. The nominal capital of the companies interested amounts to some \$4,000,000, and over \$100,000 has already been expended. The enterprising capitalists who have taken upon themselves the task of improving and developing so important a resource, have the best wishes of the Island of Cape Breton, and it is to be hoped that their enterprise will succeed to the fullest extent, as it opens an immense and prosperous future to the districts in question.

Should these enterprises prove successful, there are several localities in Nova Scotia which will probably receive attention.

ACCIDENTS.

During the year 1880 the following fatal accidents occurred :—

1. April 11th.—C. Connolly, engineman, Vale Colliery. Burnt by gas in lodgment.
2. Sept. 10th.—Laughlin Morrison, collier, Albion Mines. Fall of coal.
3. Nov. 25th.—John Whitemore, miner, British American Co., Montagu. Fall from tub.
4. Dec. 24th.—James Turner, collier, Acadia Colliery. Fall of coal.
5. Oct. 12th.—Jas. Fraser, J. D. Conway, Charles Boram, Chas. Lycom, Merles Benoit, Hugh McElvie—Albion Mines. Influx of water.
6. Nov. 12th.—C. Dunbar, J. McGlaughlin, Dan. Cummins, J. Morrison, Jas. Mitchell, W. Murdock, J. Ryan, Rory McKinnon, J. Carr, J. McLean, J. Cummins, Murdock McDonald, J. Roberts, E. Roberts, W. D. Ross, Ed. Savage, J. Johnstone, Ronald McDonald, J. Crawford, W. Lewis, J. Skinner, Thos. Sullivan, Jos. Nering, J. Morrison, 2nd, J. McNorton, W. Dunbar, Lewis Thomas, J. McInnes, Dan. Sutherland, Angus McKay, Ed. Roberts, 2nd, H. Haddon, Thos. Rogers, Jas. Lennan, Angus McGilivray, R. McLeod, T. A. McKay, H. McLean, Rory McKinnon, 2nd, J. B. McLeise, Alex. McDonald, J. McEachern, Angus McDonald, (44). Foord Pit, Albion Mines. Explosion of fire damp.

The accident first mentioned was caused by the ignition of gas in the bord above the lodgment in the Vale Colliery. The place in question had been always found free from gas, and was daily visited by the pumpman, in order to allow the water collected in the bord to pass to the pump lodgment. From the investigation made, it appeared that the gas had issued from the solid coal to the dip, possibly owing to a movement in the roof of the new dip winnings, which were being driven a few yards away.

The death of Laughlin Morrison was caused by his holing into a lype, which allowed a mass of coal to fall upon him; and the fatal accident to James Turner was due to a mass of coal falling on him as he was preparing a pillar cut.

On May 21st, three men were slightly burned by gas in the Foord pit, Albion Mines, the shot having lighted some gas in a canch a short distance from the face. The shot-firer was discharged from his position, as the place had evidently not been examined before firing the shot.

Six accidents were reported as causing severe injuries by falls of roof and coal.

On the 9th February a miner, climbing the ladders of the Rose gold mine, Montagu, slipped and fell to the bottom, and was severely injured. Later in the season, a man at the same mine was injured by stupidly putting a dynamite primer too near an open fire.

At the Vale Colliery, October 4th, a miner named John Beaton was charging a shot with his naked light on his head, and fired the powder in the hole, the sparks ignited the powder in his can and burned him severely.

At Lingan, during the summer, James Warburton, collier, while giving a man a charge of powder out of a three-pound flask, held his lamp beneath the powder, which ignited and burned him slightly.

Among the miscellaneous accidents, A. McDonald, bottomer at the Vale Colliery, had his leg broken by the rope of the rake giving way and allowing the load to run back into the landing; and a driver at the same mine suffered a similar injury from omitting to get off his tub when it was approaching the boxes on the same track.—At the Spring Hill Mines D. McInnes was cutting a boom at the entrance of his bord, and the projecting end was struck by the balance cage, causing injuries to one of his legs.—At the Acadia Colliery, a shiftman was injured by a tub running away and striking him.

On the 12th of October, a holing was made from one of the rise-bords of the Foord pit, Albion Mines, into the Muir slants of the Bye pit. These slants, driven to forwin the Foord pit, were abandoned on account of a fire which rendered it necessary to fill part of the workings with water. They were cut in the upper part of the main seam, and were about six feet high and seven feet wide. The working place in the Foord pit which holed into them was about twelve feet high and eight feet wide, and had the proper bore holes, which were nearly double the length prescribed by law. The flank bore hole had been bored below the holing stone, which was about six feet from the roof, consequently it passed a few inches beneath the slants, and the upper part of the bord advanced until about two feet of coal was left between, when the pressure of the water broke it away. The quantity of water was not large, but as the slants dipped at a heavy angle, it came with great force, and swept tubs, rails, etc., through the opening.

James W. Fraser, underground manager, James D. Conway, overman, Hugh McElvie, roadsman, and the three men working in the bord, were killed by the rush of water.

On the 12th of November, an explosion of fire damp took place in the south side workings of the Foord pit, Albion Mines, causing the death of 44 persons. The cause of the explosion is unknown, as no one who was in that part of the workings escaped. An inquest was held by George Murray, Esq., M. D., Coroner, with Jno. McKay, Esq., as foreman of the jury, on the body of Angus McGilvray, who was found near the shaft dead from after-damp, and a verdict given that

the management of the mine was in accordance with the requirements of the Mines Regulation Chapter, and that all precautions had been taken.

The first explosion took place about half-past six in the morning, and blew the cover off the fan drift; this was replaced, and six men partially insensible were sent up by the overman, John Dunbar; meanwhile the men on the north side left the pit by the Cage drifts.

A party then descended the shaft and found another man in the south side insensible, and he was sent to the surface. They tried to advance further into the workings, but were unable to do so on account of the after-damp.

A few hours later, attempts were made to restore the south side ventilation, which was completely deranged. This was being successfully carried out, and two bodies recovered, when, at 6 o'clock the following morning, the presence of fire was discovered and the pit was abandoned.

The ventilation was diminished as far as possible in order to keep the north side workings free from gas, and still furnish a minimum supply of air to the south side. It was conjectured that the fire was burning in some dry wood used in timbering a heavy fall in the mine about 400 yards from the shaft, and it was hoped that it would die out. This expectation was strengthened by the character of the returns, which, at 6 p. m., were resuming their normal condition.

However, at 11 p. m., another explosion took place and work was commenced to close all openings, and to open a trench to the river. This was done with all possible speed, and the water was allowed to run in until the bottom of the upcast shaft was sealed.

All attempts to account for the immediate cause of this terrible explosion are necessarily conjectural. Had there been no fire, a careful examination of the workings after the ventilation had been restored, would doubtless have revealed the point where it originated, and probably the cause. The chief points, however, that were observed by the exploring parties were, that the flame of the explosion had not reached as far as they were able to penetrate, that immense volumes of dust had been blown toward the shaft, that these volumes of dust were partly deposited in the south side levels near the shaft, and partly blown into the north side. Here the dust apparently kindled at the light in the lamp cabin, burned the horses, and the lampman to such an extent that he died in a few days.

The evidence given at the inquest showed that the pit was free from gas, there being but small quantities in one or two working places, and that the air courses were in good order. The quantity of air passing the south side working places was measured a day or two before, and amounted to 25,260 cubic feet per minute.

The greater number of the unfortunate men must have been gathered at the head of the dip slants, waiting for their picks, etc., which had not left the pit bottom when the explosion took place. The explosion has been considered to have originated in these slants, and, on arriving at the main level, to have divided, part of it going to the rise to the upcast and part coming direct to the drawing shaft.

The following abstract of the money received for the relief of those left destitute at the Albion Mines, for which I am indebted to G.

Carritt, Esq., Secretary to the Fund, will show the amounts contributed by the various Provinces, etc.:

ALBION MINES RELIEF FUND.—ABSTRACT.

Nova Scotia.....	\$17,780 11
New Brunswick	5,491 18
Ontario and Quebec.....	4,944 59
United States	816 25
P. E. Island	1,064 41
London, G. B.....	502 43
	<hr/>
	\$30,598 97

In connection with the presence of fire-damp in mines may be mentioned Prof. Forbes' proposed detector, which is said to have been satisfactorily tested. It is based on the fact that when a tuning-fork is brought into the vicinity of a tube filled with ordinary air, a response is elicited only when the tube is of a certain length. When fire-damp of a lower specific gravity than air is introduced, the sound velocity is increased, and the length of the tube must be greater. By an index on the tube it is claimed that the presence of fire-damp to .5 per cent. can be registered.

It is well known that if a long dry tube, open at both ends, be held over a jet of burning hydrogen a musical sound is produced, the pitch and quality of which vary with the length, thickness and diameter of the tube. It has been proposed to adapt such a tube to a safety lamp underground in the mines, and to place it near a telephone in communication with another in the manager's office on the surface. The alteration of the sound, due to a greater or less admixture of gases with the air of the mine, would warn the manager of the state of the atmosphere in the workings.

At a late meeting of the North Staffordshire Mining Institute, Mr. Sawyer gave some interesting particulars taken from the report of the French Commission of Enquiry, which is to appear in the next number of the *Annales des Mines*. He confined himself to that part of the report bearing upon the pressure and disengagement of fire-damp, on account of its reference to sudden outbursts. "Although (he read) in the opinion of a large majority of practical men fire-damp pre-exists in the pores of the coal or of the surrounding rock in a gaseous condition, and subjected to greater or less pressure, the views of a certain number of engineers cannot pass unnoticed. They consider it as the product of dis-association at the last moment of very volatile liquid, or even solid compositions contained in the coal. This hypothesis has not as yet been borne out by chemico-scientific researches. Mr. G. Arnould, engineer-in-chief of the Belgian Mining Corps, cites the following observations in its support:—"The fact that fire-damp is soluble in water, as has been shown, appears incompatible with the properties of marsh gas; the presence of certain hydrocarbons in the pores of the coal; the discovery of a large quantity of a brown substance in the pores of the coal, by Schultze, which at first prevented the structure of the mineral from being made out; a very volatile oil,

which on being lighted produces a large flame, having often been found in company with hatchetine (a mineral tallow) in the central cavity of nodules of siderite; coal in fiery mines presenting sometimes a greasy and shiny appearance, which is almost immediately lost by exposure; fiery coals, and especially bituminous coals, also losing their caking property pretty quickly when exposed to the air. The sudden outbursts which occur more and more frequently in the neighbourhood of Mons, causing dreadful accidents, would seem to corroborate this hypothesis. They are always associated with the presence in the seam of a kind of combustible called *houile daloide* in Belgium, and *fusair* at St. Etienne. This black substance is fibrous and powdery, and is nothing but charcoal remains either of arborescent ferns, sigillaria or cordaites, which have preserved their structure. Bituminous coals often contain a pretty large number of layers of daloide coal, producing in that case more dust and small coal. Accidents from sudden outbursts, unknown before 1847, even on an examination of official documents of as far back as 1818, are becoming more frequent every year, and seem to grow in importance with the depth. None have been observed above a depth of 280 metres. The greatest number have occurred at a depth of from 350 to 500 metres, but this must undoubtedly not imply a real maximum, for when greater depths are considered the number of mines decreases rapidly. Sudden outbursts have always been accompanied by a projection of a large quantity of small coal, which has sometimes filled the galleries for a distance of 40 metres, and whose volume has been as great as 420 cubic metres. Sometimes outbursts, instead of being sudden, are more appreciable. The phenomenon has often been accompanied by an intense refrigeration, and the pulverised coal has been found even after some time as cold as ice. This last circumstance would tend to meet one of the objections which have been raised to the non-gaseous condition hypothesis of fire-damp previous to its escape—the enormous refrigeration which would apparently accompany the volatilisation of such quantities of matter.”

An improved apparatus, forming at once a safety lamp and a measurer of fire-damp, has been invented by Mr. L. Gossiaux, mine manager at Gardanne, who starts upon the principle that in ancient times the miners to get rid of the gas set it on fire, and concludes that the simplest manner to dispose of the gas is to burn it in a properly constructed lamp, which will register the amount burnt and the amount in the atmosphere, and in the latter case give notice when the air is dangerously surcharged. He designates the lamp which he has constructed to fulfil these conditions the Phanero-Gresoumetre. It is stated that the Belgian Government have lately ordered several lamps to be constructed, with which they intend to make exhaustive experiments.

A practical application of this idea is shown in the Hurd Silent Gas Engines, which claim important advantages over these already introduced. They can be used in Mines, and worked by the explosive gases collected therein or elsewhere. The igniting agent is enclosed in an apparatus, constructed according to the Davy lamp principle, to prevent explosions from external fire-damp. The gas is diluted, and

fed through injectors by an intermittent action, with pressure governors so as to prevent the admission of a dangerous amount.

These engines can be made to 50 horse-power, and upwards. It is said that practical experiments have shown, that with ordinary coal gas these engines turn to useful effect not less than ten times as much heat as ordinary high pressure engines.

The practical introduction of engines of this nature would be found an invaluable adjunct to all operations of mechanical coal cutting and wedging appliances, as the motive power could be transported and brought close to the working face.

It will be noticed that the use of the Telephone has become common in the coal mines of the Pictou district—its proposed application to give warning of fire-damp has been spoken of. This use is capable of many extensions, an important one is its application to pumps, underground engines, etc., whereby the Engineer at bank can satisfy himself of their condition by listening to the sounds given out by the valves, &c. On account of the ready means it affords for communication with underground operations its use, I believe, has been enforced by one of the Australian Legislatures.

The February and March transactions of the North of England Mining Institute contain two valuable papers on safety lamps.

The results arrived at by the Belgian Royal Commission on lamps are given, and some of the conclusions will prove interesting to those charged with the safety of miners in seams giving off gas.

Certain exceptional tests were imposed on the lamps submitted for trial. Among other results it was found that spilling oil and coal dust on the gauze facilitated explosions, especially in rapid explosive currents. Jerking and abrupt movements were found to materially increase the danger of explosion.

Variations in the proportions of the gaseous mixture facilitated the passage of the flame to the exterior of the lamp. Thus the lamp was first put out by means of a sufficiently strong mixture, maintained for several minutes to heat the metallic parts. The influx of gas was then gradually diminished nearly to the point where the mixture ceased to be inflammable, when ordinarily the lamp was totally extinguished, or the flame passed up the chimney into the gauze cylinder. The effect of ascending or descending inclined currents of air was found to be highly dangerous. Whirlings and oscillations of the flame were produced, and every lamp exploded. Thus the whirlings produced by currents of air entering a level from a cutting or stapple are highly dangerous if the air be charged with gas, and too much caution cannot be exercised by miners working or approaching such places.

The experiments, as a whole, proved that no lighting apparatus can be considered absolutely safe. It was observed that the Davy and Clanny (Deputy) lamps gave no security in explosive currents moving at a velocity of 7.38 feet per second. (The Commission of St. Etienne had already found that they ceased to be safe at a velocity of 5.57 feet per second.)

The Mueseler lamp generally comported itself well. Of the various types of this lamp the Joassin proved the best, the inclined currents and the varied mixtures of gas alone affecting it. But these are the

most dangerous circumstances to which a lighting apparatus can be exposed.

It was also invariably found that the power of the gauze to resist explosive influences increased in proportion to the thickness of the wire and the smallness of the mesh. It is also worthy of remark that in no case were injurious effects found to follow broken or fractured glasses, the fragments remaining secure in the sockets.

In the decree supplementing that of 1876, rendering the use of a certain type of Mueseler lamp obligatory in fiery mines, it is stated that rapid currents of air are particularly dangerous when their action manifests itself by the crushing of the flame upon the wick, and that a reversal of the air supply in the lamp extends the inflammation of the gas at once into the upper cap.

The responsible agents of the Collieries should watch that the workmen handle lamps with prudence, and that they do not expose them to concussion or irregular motions. They should be held as much as possible sheltered from rapid currents, particularly those producing vacillations of the flame.

The Commission insisted upon the important point, too often forgotten by masters as well as workmen, that no lamp can be considered a perfect safeguard, and that the Mueseler claims to be only a lamp immeasurably safer than the Davy and Clanny, but still that it requires every possible adjunct of good ventilation and careful handling.

The Mueseler is the most delicate lamp for detecting gas in the air currents. It shows a blue aureola or cap in places where the Davy shows none, thereby discovering a smaller percentage of gas. This is no doubt produced by the steadiness of the flame, caused by the regular draught and the flat wick, which is readily moved by a broad picker. A good deal also depends on the quality of the oil, as with a pure vegetable oil the flame can be lowered so as to remove the luminous envelope. Mineral oils should never be taken underground; in Belgium they are prohibited, as they were found to lessen the safety of the lamp.

This lamp gives the best light of all in use, and the flame is a very steady one. The lamp requires rather more care in handling than a Davy, and should be kept in an upright position, which care is in itself an additional element of safety in a dangerous atmosphere.

In seams giving off blowers, the use of simple Davy lamps at the face is very questionable. The recent explosion at Lycett, which was due to the gas lighting at the only Davy lamp at the face, shows this strongly. The other lamps used in the pit were a modification of the Mueseler.

The Mueseler lamp, made by Messrs. MacKay Bros., Outre-Meuse-Liege, has been satisfactorily used in England. It weighs $2\frac{1}{4}$ lbs., and costs 4s.

The proposal to utilize phosphorescence in places where lamps cannot burn or are a source of danger, is not a novel one; but owing to the cost and unreliability of the arrangements, the idea has generally been abandoned.

The origin of phosphorescence is perhaps not clearly determined yet, for although it may be difficult to assign any cause other than oxidation or an equivalent chemical action, the fact that the tube of calcium

sulphide sealed by Canton in 1764 still retains its luminosity would seem to point to other causes.

Becquerel has studied the subject of phosphoresence with much attention, and states that the sulphides of calcium, barium, and strontium are the most remarkable in regard to the duration of their light. The phosphori prepared by different processes vary greatly in the color and duration of their light.

Balmain's process consists in preparing the best of these bodies with oil, so that they can be applied like ordinary paint. The Admiralty have ordered, for use in powder magazines and other places, a number of framed screens, each of about $1\frac{1}{2}$ square foot surface, prepared with the phosphorescent paint. The illuminating power of each screen is about one-fourth that of an ordinary Davy lamp.

The invention will come into extensive use as soon as its merits are more generally known.

It should be remembered that, as regards its applicability to lighting mines, damp and sulphuretted hydrogen impair its luminosity, but this may be guarded against by sealing it in glass.

ELECTRICAL LIGHTS IN COAL MINES.

When public attention was first strongly drawn to the wonderful applications of the electric light, it was hoped that the dangers of coal mines would be lessened by its introduction, and that its strong light would enable underground operations to be conducted with safety and lessened expense, and that the dangers of ignition of fire-damp would be reduced to a minimum by its isolation and the removal of the temptation held out to workmen to tamper with the safety lamps. However, the expense, difficulty of division, and the unreliability of the light, caused a reluctant abandonment of this hope, except in the breasts of some sanguine experimenters, to whom, after the lapse of a few years, we owe the gradual removal of the practical difficulties which embarrass the working of many valuable inventions and discoveries.

Turning our attention more particularly to underground lighting, we find that Mr. J. W. Swan, of Newcastle-on-Tyne, has recently shown that this difficult problem is on the fair way to a practical solution. The light produced by his system is of the incandescent class, and the essential feature of novelty appears to be the excessively small carbons used, and the completeness of the vacuum in which they are heated. He explains that the carbon filaments with which his lamps were fitted are about one hundredth of an inch in diameter and both hard and elastic. He stated that a well-made lamp, with a carbon of one-tenth of an inch area, would endure several months if not pressed to give a light exceeding 30 standard candles, and that it could be isolated from fire-damp by being enclosed in water.

As to the commercial value of the invention, no definite opinion can be formed until full details of the cost and durability of the carbons can be obtained, but when such men as Ayrton and Varley express their satisfaction with the arrangement, strong hopes can be entertained that Collieries will before long be brilliantly and econo-

mically lighted by a method which will render the occurrence of fire-damp explosions from illuminators practically impossible.

These lamps have been kept burning for nearly three months, and Mr. Swan claims that 36 lights, each of 30 candle power, can be produced by 4 horse-power indicated; and that an inexperienced person could fit a new lamp much more easily than an ordinary gas globe can be fixed in its place.

Much has been written about the value of the study of the barometer in connection with the effects of atmospheric pressure in the emission of gas from coal. There is, however, a great diversity of opinion on the subject among those who have paid attention to it.

There can be no question that any diminution of the pressure, either of the strata or in the case of new faces of the pressure of the atmosphere, causes an exudation of gas. But it must be remembered that the common oscillations of pressure of the atmosphere are of comparatively small amount.

Thus a fall or rise of one-tenth of an inch, which rarely takes place rapidly, would indicate a change of pressure of one-half a pound per square inch, a difference having comparatively little effect. If these atmospheric oscillations have the ascribed effects in the exudation of gas, then the gas must exist in the coal at a pressure nearly the same as that of the atmosphere, which is contrary to the generally received opinion.

Of the utility of the barometer in Mines having large goaves, which may sometimes be likened to immense gasometers, there can be no question, and the preceding remarks bear on this point. In this connection a new barometer, having a glycerine column, is particularly useful, as owing to the increased length of column the changes of pressure are noticeable at once, and much more clearly marked than in the case of the mercurial balance.

There is, however, another point in connection with the barometrical variations, that is too often lost sight of. The warning of the fall of the mercury is applied only to the pit workings, but it must be remembered that this fall means an alleviation of the pressure over a large extent of the earth's surface. Thus, a fall of one inch means the removal of a weight of nearly one million of tons from every square mile of ground. Cases might readily arise under which this change of pressure acting over hundreds of square miles would so alter conditions of stability that openings could form and gas be given off at the points of least resistance, which would notably be in deep Coal mines.

CONDENSATION OF STEAM.

The common use of long lengths of pipe to convey steam to under ground pumps will render the following results, taken from a paper read before the North of England Mining Institute some months ago, by W. Bird, of interest to those engaged in Coal mining.

There are various non-conducting materials used, of which felt is the most efficient, but sawdust, fir wood, and coal ashes give very good results. Their comparative efficiency is shown in the following table, in which the diameter of the steam pipe is assumed at four inches, its

temperature at 212° F., and the temperature of the surrounding air at 60° F.:—

SUBSTANCES.	OUTSIDE TEMPERATURE OF ENVELOPE IN DEGREES, F.				
Thickness.	$\frac{1}{2}$ in	1 in	2 in	4 in	6 in
Woollen Felt	107°	86°	73°	65°	63°
Sawdust	123°	98°	80°	69°	65°
Fir Wood	137°	110°	87°	73°	68°
Coal Ashes	158°	129°	101°	81°	73°
Plaster	188°	168°	140°	109°	95°

This table shows the effect of increasing the thickness of the non-conducting envelope, but this thickness has an economical limit independent of the increased cost of material. Take the case of four inch pipe encased with two inches of felt. The total diameter will be eight inches. Supposing it encased with six inches of felt, the total diameter will be sixteen inches. The surfaces of the pipes will then be in the proportion of one to two. With the two inches of felt, the table shows the outside temperature to be 73°, and with the six inches of felt to be 63°. Thus, whilst nine degrees is gained by the increased thickness, the radiating surface is doubled, and the gain becomes illusory.

The result of the author's trials at Wingate Colliery are embodied in the following table, and present remarkable results.

CONDITION OF PIPES,	Loss of Heat in units per minute.	Equivalent Steam condensed per minute.	Loss of Steam per foot length of pipe in cubic ft. per per hour.	Loss on Steam consumption.	Loss in horse power.
Uncovered	11,783	Cubic Feet. 79.42	6.59	Per Cent. 12.16	10.2
Covered	1,739	12.08	.96	1.68	1.5

Thus the covered pipes show a gain in actual horse power of 8.7 and if the amount of coal burned is estimated at 5 pounds per horse power per hour, the saving in fuel is more than 9 cwts. per day. If the fuel is valued at \$1 a ton, this represents an annual saving of \$175.

The saving in steam means that less boiler power is required when covered pipes are used. Thus an important economy is effected in the first cost of boilers, in their annual deterioration, and in the cleaning and repairs required to keep them in proper order.

I wish also to draw your attention to the fact that there is a good deal of carelessness shown throughout the Province by those using boilers in mining operations. Badly mounted gauges, the use of acid

waters, leakage, dripping of water from pipes, valves, etc., allowed to run over boilers, levers with pit wheels, etc., for balances, all show that the importance and economy of a properly equipped and well preserved boiler are not sufficiently appreciated. This want of attention too often leads to a very rapid deterioration and loss of the boiler, and not unfrequently results in destruction of life and property.

The subject of boiler inspection has been very carefully gone into by the British Parliament, and it is believed that the matter will shortly be settled in favor of compulsory registration and inspection. The importance of this subject in our own Province may be gathered from the fact that out of 728 boiler explosions in England, 224 occurred in boilers of the Cornish, Lancashire and other internal flued type, 101 occurred in locomotive boilers, and 168 in plain cylindrical externally fired boilers; and that these are the styles of boiler most used among us.

Again, taking the causes of explosions of steam boilers in England for the four years ended June 30th, 1870, we find that out of 219 explosions, 43 per cent. were due to faults in construction or repairs, 28 per cent. were due to faults which should be detected by periodical examination, and 24 per cent. were due to faults which could have been prevented by careful attendants. The recognized Continental Boiler Inspection Associations have special rules approved of by Government. The following may be cited:—

“Explosions occur in boilers (1) from natural deterioration of materials, (2) from defects of construction, and (3) from incapacity of those in charge.

“They are principally due to defects unobserved, from the reason that no pains have been taken with their examination. Examination or inspection is often neglected or postponed on account of the cost of inspection.

“Defective materials and bad workmanship frequently occur in all classes of boilers. Low price often takes priority over quality. Testing by the hydraulic press is not sufficient to indicate practical weakness or defects.

“The internal examination of boilers is the only reliable mode of ascertaining their condition. When this examination is carefully effected it usually affords the means of ascertaining the safety of the boiler.

“Every separate part of a boiler should be carefully examined, because each one may lead to danger.”

Some months ago a letter was addressed by the English Inspectors of Mines, at the request of the Secretary of State, to the various Mine Managers, drawing their attention to the inventions in use for disconnecting in case of overwinding, and asking their attention to the subject with a view of having them applied in cases where they are not already attached.

The Inspectors of Mines in England are, I believe, generally in favor of recommending the adoption of safety hooks, and will probably before long have their use legally enforced.

There are no returns of the number of “overwindings” that happen, for they are never reported unless attended with fatal results. Since 1859, 178 accidents have occurred from overwinding, and the following table shows the proportions of the various causes:

	Per cent.
1. Defect of Engine.....	7.30
2. Defect of Indicator.....	6.18
3. Engineman's attention diverted by persons in the engine room,	5.62
4. Incompetent Engineman.....	3.37
5. Engine reversed and cage drawn wrong way.....	12.36
6. Fault of Engineman omitting to stop load at proper place..	61.80
7. Failure of Safety Hook.....	2.25
8. Cage lowered into sump.	1.12
	<hr/> 100.00

Thus 98.88 per cent. of the lives lost would have been saved by the adoption of efficient safety hooks.

Numerous hooks have been invented for detaching the cage in case of overwinding, some of which include provision for suspending the cage by catches, wedges, etc. Among the best known safety hooks may be mentioned Knowle's, King's, Ormerod's and Walker's.

It has been said that the use of safety hooks has a tendency to render the engineman careless, but this is not necessarily the case, for the rule should be always applied, that every case of overwinding should be punished by a fine or dismissal.

The liability of the hooks to become rusted and lose their certainty of action is also an invalid objection, because the regular examination of the winding gear, required by the Mines Regulation Act, when applied to them also, is ample protection.

In connection with the difficulty frequently experienced in this Province in procuring skilled colliers, the use of labor saving machinery, especially for coal cutting, is one deserving of attention, particularly in Cape Breton, where the beds are favorably situated for this purpose. I give a summary, which I believe is a correct one, of the results of tests of the best known English machines, and would add that there are several in use in the United States claiming to be cheaper and equally efficient.

About the oldest and best known machine is that of the Messrs. Firth, of Leeds, by which the coal is brought down by a pick. In the hard cannel coal about 45 yards have been cut in a shift of eight hours, and that may be taken as a low estimate, for where the Silkestone bed has been got by banks averaging about 50 yards, two have been cut in one shift, including the removal from one to the other. The working expenses do not average, we are told, more than 15s. a shift, including the consumption of coal. The machines are now at work near to Leeds, and have been for several years. Hurd and Simpson's machine consists of a cutting wheel driven by an ordinary bevel pinion. It has cut in medium hard coal 20 yards per hour, 1 yard deep, with a 3 in. groove. Hurd's patent self-acting coal getter is now being worked at several places, and is much liked. It is well adapted for seams from 20 in. in thickness and upwards, so that the coal can be got and filled at a cost not exceeding 5½d. per ton in a 20 in. seam, and at considerably less in seams above that thickness. Mr. Hurd is also the patentee of a self-acting coal getter for driving headings worked by steel rope or compressed air. The coal can be got and filled

in a heading 9 ft. wide by 6 ft. high, at a cost not exceeding 3s. 6d. per yard forward, advancing at the rate of upwards of 1 yard per hour, including the removal of material.

The machine is in successful operation in England and Scotland, and also on the Continent. Gillott and Copley's machine, which is a rotary one, has been adopted at several collieries. In five days the machine cut 495 yards, from 3 ft. 3 in. to 3 ft. 4 in. under, and it had to be removed to different faces in the same seam. One of the machines was only 21 in. high, and where the seam was very thin it could be reduced about 6 in., but this would necessitate rather more room for the width. Winstanley and Barker's machine is well known in Lancashire, and has undercut 25 yards an hour, 3 ft. in depth and 3 in. high, three men being required as attendants. The machine does its work well, especially in a thin seam of coal, its height being only 22 in. The patented machine of Rigg and Meiklejohn has been tested both in the North of England and in Scotland, and at Hetton the work done was at the rate of 29 yards per hour, the groove being 3 in. high, and the depth into the coal 3 ft. 2 in. It will be seen that the machines we have noticed have all been thoroughly tested. One of the great advantages of coal-cutting machinery is that far less slack is made than by hand picking. If we take soft coal cut by hand in some instances not more than 60 per cent. of large marketable coal is obtained, whilst by the machine there would be from 75 to 80 per cent. In the interest of mine owners, as well as investors, it is to be hoped that the development of coal-cutting machinery will advance more rapidly than it has done so far, for it can be adapted to the conditions and modes of working in almost all coal mining districts.

GOLD MINING.

I would beg leave to call your attention to the indifference shown by our gold miners to the various pyrites contained in our quartz lodes. The percentage present varies of course in every lode and district from one-half of one per cent. to 25 per cent.; but assuming it at an average of 5 per cent. on all material crushed, there has been over 19,000 tons of these substances thrown away since returns have been made by millmen.

Taking the average of various assays of gold and silver contained in these sulphurets, etc., it will be found that their value is as follows: Per ton of 2,000 lbs. gold, 2 oz. 4 dwts.; silver, 4 oz., 17 dwts. Total value, \$50.48, not including the values of the copper, nickel and cobalt which are generally present.

In other words, over a million of dollars has been thrown into brooks and swamps during the last 18 years. This waste should not go any further; an inexpensive system of settling tubs or blankets will collect these valuable pyrites, and they will find a ready market at the reduction works in Portland, East Boston and Brooklyn. The works of the former company have been laid out with a view to treatment of ores of classes including our ordinary copper and auriferous sulphurets, etc.

A paper read before the American Institute of Mining Engineers, Feb., 1880, by Prof. Richards, gives some trials of quartz crushings which are of interest. One sample of New Hampshire quartz, weigh-

ing 4447 lbs., gave by fire assay \$4.14 in gold to the ton, at \$20.67 per ounce Troy. After crushing, the following yield of gold was obtained:—

Battery amalgam	\$4.573
1st plate.....	2.694
2nd, 3rd, 4th and 5th plates .....	.544
Mercury trap .....	.038
	<hr/>
	\$7.849

Value of the pyrites concentrations, \$5.17. The total amount of gold saved by amalgamation was 85.2 per cent.

A sample of quartz from the Field lode at Tangier, which when crushed in lumps of one cubic inch showed no gold, yielded as follows:—

Fire assay, \$14.24.

Battery amalgam.....	\$9.1324
1st and 2nd plates .....	.1389
3rd, 4th and 5th plates.....	.0319
Mercury trap .....	.0134
	<hr/>
	\$9.3166

or at the rate of \$13.24 to the ton.

The pyrites concentration yielded at the rate of \$10.33 per ton.

The amalgam from the battery was in large coarse nuggets, cemented by liquid mercury.

This yield from quartz showing no gold is similar to that observed in Oldham, where quartz showing but traces of gold has yielded as high as six ounces per ton.

The method of charging the plates, recommended by him, is a modified form of that advised by N. S. Keith (Raymond's Report, 1871.)

The plate is scrubbed with sand, salammoniac, quick-lime and mercury, until it is plated. Dilute nitrate of mercury will plate much quicker, but not so permanently, thoroughly, or deeply. If very obstinate spots are found, dilute nitrate of mercury may be used; and if this fails, a plumber's scraper will remove the spot. When thoroughly plated and washed clean, the plates are carefully dried with cotton batting. Mercury is then sprinkled on through chamois skin, and distributed with cotton.

In order to remove the yellow stain which retards the amalgamation, it is proposed to use silver amalgam for charging the plates. This is made by dissolving silver dollars in nitric acid, and adding about ten times as much mercury as silver. The silver is precipitated as amalgam. After standing over night the liquid is decanted and the amalgam well washed. One silver dollar will make amalgam enough to cover four square feet of plate.

The amalgam is dried and squeezed in chamois skin to remove excess of mercury. It should then be painted dry on the bright plates with a flat hog's-bristle paste-brush, and allowed to drain twelve hours to avoid the presence of free mercury on the plates during the run, as it is liable to flour and be lost.

Silver amalgam is considered as good a catcher of gold as the gold amalgam, and also obviates the "overlapping" error, because the gold

never comes to any considerable extent into contact with the copper plate, and hence, when the plates are scraped, the whole of the gold is practically removed with it.

A process is at present attracting some attention on the Continent which may prove of importance to those interested in our gold mines. It is described as being based upon the employment of bi-chlorate of mercury in solution, to replace the metallic mercury employed formerly. The bi-chloride of mercury alone will not touch gold, but immediately you bring iron in contact with it the reaction is instantaneous with formation of chloride of iron, metallic mercury, and gold amalgam. This, it is said, is so certain and so searching in its action in a big barrel of gold ore revolving with iron balls inside, that the amalgamation of every particle of gold is complete in about twenty minutes. Then the contents of the barrel are run into another apparatus of an ingenious construction, with amalgamated copper plates, which retain the finest grain of gold amalgam contained in the mass of ore treated. This is collected and treated as all amalgams usually are. There is no loss of mercury worth mentioning, and Mr. Designolle, the patentee, engages to extract gold from any ores, even tellurim gold, which is almost unattackable by any known process; and to extract 25 per cent. more gold from any of the ores now being worked by any ordinary process. As each machine only works ten tons of quartz in twelve hours, ores containing less than one-half ounce to the ton would hardly pay; but where the process will, it is considered, be of great advantage, is in India, Australia, Brazil, or Canada, where ores hold sulphur, arsenic, &c., rendering complete extraction by ordinary methods difficult, if not impossible.

The use of reversing plates for catching gold, referred to in my last report, has been introduced in two or three mills, and, I understand, appears to work satisfactorily.

Among our gold miners it has become an axiom that no gold occurs in connection with our so-called granite. The development of important gold mines in the syenitic granite of Marmora, Ontario, is important in this connection. It is not known if our granitic rocks are of the same age as those of Ontario, but the subject is one well worth attention.

In connection with the alluvial gold bearing deposits which have more than once been proved to exist in our lakes in the gold districts, the Roy Stone Dredge supplies a power which may be found serviceable in testing or working them. The dredge is simply one long, 15 inch diameter iron pipe, to which are attached two hydraulic jet nozzles connected with a steam pump. It is to be used especially in mining the river beds and their adjoining banks. The iron pipe has one end resting upon the river bottom, covered by a coarse grating, to which is attached one jet nozzle; the stream from this, under 150 pounds pressure in the pump, is directed against the river bottom, and rapidly digs up the gravel and clay of which this is composed. The other jet lies centrally in the iron tube, three feet from the lower end, and pointing upward. This jet throws a powerful stream up the long pipe, which forcibly carries with it a volume of water equal to the capacity of the pipe, together with all the solid material the first jet can dig up. The inventor states the dredge will raise, five feet above the

surface, and through a tube one hundred feet long, seven cubic yards of solid material every minute; through fifty feet, the amount is eleven cubic yards, and through twenty-five feet, sixteen cubic yards.

Such a machine could be cheaply transported and set to work from a scow or through the ice, and by increasing the engine power, water could be pumped to enable it to work old channels, etc., now destitute of water. A large company has been formed to use it in testing certain localities in the north of the State of Maine which are supposed to be auriferous, as has been found to be the case with the alluviums of the Chaudiere flowing north from the same district.

The manufacture of the various grades of dynamite has been commenced by the Acadia Powder Company, and it is to be hoped that they will be able to place this invaluable explosive before our gold miners at a cheap rate.

The company propose, I believe, to manufacture the nitro-glycerine themselves, and to make the black dynamite, and have succeeded in procuring from Quebec a "clay" adapted for the red dynamite. There are several deposits of earthy tripolite referred to by the Geological Survey of Canada as occurring in Southern New Brunswick.

A sample from Pollet River Lake, Kings County, was examined by Mr. Hoffman, chemist to the survey, and showed its adaptability for polishing and other purposes, and was considered suitable as a dynamite absorbent. Similar deposits are not uncommon in our own lakes, and some of them may prove adapted to the manufacture of dynamite.

It is stated that experiments made by the Austrian Government have shown that frozen dynamite only requires detonators of say five times the ordinary power, to be quite as efficient as when used in its normal state. Should this prove to be the case, it would be a great saving of trouble to our gold miners, and the cartridges, being manufactured here, could have slight modifications made in their shape, to assist the effect of the detonators.

The following papers bearing on the Geology and Mineralogy of Nova Scotia, have been published during the past year:—

- DR. B. J. HARRINGTON. Notes on Pyrrhotites and Titaniferous Iron Ore. Nat. His. Soc. Montreal.
- DR. HONEYMAN. The Geology of Pictou Co., Nova Scotia. Inst. Nat. Science.
- DR. DAWSON. The Iron Ore Rocks of the East River, Pictou. Nat. His. Soc. Montreal.
- PROF. RICHARDS. Notes on Mill Work and Testing Gold Ores. American Inst. Min. Engineers.
- E. GILPIN. The Mines and Mineral Lands of Nova Scotia. Report to the Government of Nova Scotia. The Gypsum of Nova Scotia. North of England Institute of Mining Engineers.
- Geological Survey of Canada, 1878-1879. Assays of Nova Scotia Minerals.

I may remark that the Report on the Mines and Mineral Lands of Nova Scotia has been extensively circulated in the United States and England, as well as in the neighboring colonies, and has been useful in directing attention to our mineral resources.

The principal mining and other papers have noticed it favourably, and their comments have resulted in numerous applications for copies by persons resident in the United States and England.

The leading Canadian Emigration agents have kindly assisted in distributing it where it would prove of service, and be accessible for reference.

The report was made as far as possible a concise and correct description of our coal, gold and iron ores, as well as of those less known, and a description of gypsum and other mineral substances which are found here in great abundance.

I insert here, in accordance with your request, the following information collected relative to coal mining. I would remark that the present forms of returns of labor render it impossible to give correctly all the information you require, and that consequently it can be considered only an approximation :—

Coal cutters employed during 1880	1496
Laborers " " "	879
Boys " " "	600
Average amount mined by each cutter.....	tons, 690
Average price per ton	\$.39
Average wages of cutters while working.....	" 1.45
" " laborers "	" .95
" " boys "	" .65
Mines worked on an average.....	days, 188
Average monthly deductions from pay—rent, doctor, coal and school.....	\$ 2.80

I have the honor to be, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,

Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN COAL.)

No.	LESSEE.	DISTRICT.	Area Sq. Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, Sarah, and others .....	.....	1
	COLCHESTER COUNTY.		
	Moir, Wm. C. et al	Tatamagouche	10½
	LEAD.		
	HALIFAX COUNTY.		
1	McClure, Charles F.	Gay's River	1
	IRON.		
	PICTOU COUNTY.		
35	Carmichael, John R	East River	1
32, 33, 34, 36, 37, 38, 40, 41	Hamilton, John and others	"	9
39	Hudson, James	"	1
43	Hudson, James	"	1
	CAPE BRETON COUNTY.		
86	Brookman, S. J. et al	N. Side East Bay	1
91	Brookman, Phoebe	East Bay	1
92	Matheson, D. et al	"	1
93	Brookman, S. J. et al	"	1
84	Protheroe, Pryse	Cow Bay	1
	INVERNESS COUNTY.		
16	Inverness C. I. & R. Co.	Whycocomagh	1
Total Area under lease			30½ square miles.

LIST OF COAL LEASES.

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
1	McKinnon, et al	ANTIGONISH CO.	3			
44	Baker, John W	CUMBERLAND CO.	1			
13, 14, 15	Black, C. H. M .....	.....	3			
21	Blight, James, et al .....	.....	1			
47	Boston, C. M. Co. ....	.....	1		John Moffat	River Herbert
25	Campbell, Alex., et al. ....	.....	1			
32, 34	Campbell, Alex. ....	.....	2			
50	Campbell, Alex. ....	.....	4			
35, 48, 49, 50	Campbell, John .....	.....	8			
31, 33, 37, 38, 40, 41, 45, 46	Cumberland, C. M. Co. ....	.....	4			
12	Donville, James .....	.....	3		E. N. Sharp	St. John, N. B.
17	Joggins, C. M. Association...	Joggins.	2	Working.	{ B. B. Barnhill, Robert Redpath.. }	Joggins.
20	Joggins, C. M. Co.	Cumberland.	2			
18, 19	Kirby, Lewis R. ....	.....	1			
5	Livesey, John .....	.....	2			
42	Lawson, C. M. Association...	Maccan.	1			
51	Macfarlane, Alex. ....	.....	1			
53	Milner, Christopher .....	.....	1			
1, 2, 3, 4	Milner, Christopher .....	.....	1			
	New York & Acadia Co.	Scotia,	4	Working.	William Bennett..	Maccan.

43	Pugwash & Spring Hill R. Co.	.....	1	Working.	{ <i>William Hall</i> ... Spring Hill.
16	Seaman, Gilbert	.....	1	.....	" " "
24	Shannon, S. L.	.....	2	.....	" " "
36, 39	Shannon, S. L., (in trust) et al.	.....	2	.....	J. S. Hickman... Amherst.
6, 7, 8	Spring Hill Mining Co.	Spring Hill	3	.....
52	"	"	4	.....
22, 23, 28, 29, 30	Styles Mining Co. (Limited).	.....	5	.....
9	Victoria Coal Mining Co	.....	2	.....
26, 27	Wright, John V	.....	3	.....
			66		
			PICTOU CO.		
1	Acadia Coal Co	Fraser	1	Working.	{ H. S. Poole Stellarton.
3	"	Acadia	1	.....	{ <i>J. Maxwell</i> Westville.
42	"	Pictou	4	.....	{ J. B. Moore New Glasgow.
23	Allan, Sir Hugh, K't	Vale	3	Working.	{ <i>John Greener</i> .. Vale Colliery.
10	Gray, B. G.	.....	1	.....
11	Haliburton, R. G., et al	.....	1	.....
13, 14	Halifax Company, (Limited).	Albion	4	Working.	{ S. Cunard & Co. Halifax.
	Intercolonial Company	.....	2	Working.	{ <i>James Hudson</i> . Stellarton.
12	"	Drummond	1	Working.	Robert Simpson... Westville.
6	Kirby, Lewis R.	.....	1	.....
15, 30, 31	Merigomish Company	.....	3	.....
25	Nova Scotia Company	Black Diamond	4	.....	H. L. Angel Westville.
20	Price, D. E., et al	.....	2	.....
24	Richey, M. H.	.....	1	.....
			29		

LIST OF COAL LEASES—(CONTINUED.)

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
		CAPE BRETON CO.				
3	Archibald, Blowers.....	Gowrie.....	1	Working.	{ Archibald & Co. { Chas. Archibald.	North Sydney. Cow Bay.
2	Archibald, Thos. D.....	"	1			
5, 28	Blockhouse Mining Co.....	Blockhouse	2	Working.	R. Belloni	Cow Bay.
29	"	"	1			
72	Brookman, Samuel.....	"	1			
76, 77	" S., et al.....	"	2			
15	Caledonia C. & R. Co.....	Caledonia	1	Working.	David MacKeen..	Caledonia Mines.
31	"	"	1			
30	Campbell, Alex.....	"	1			
23, 25, 70	Cape Breton Co., (Limited) ..	"	3		T. D. Archibald..	North Sydney.
14, 24	"	Schooner Pond...	2		Edgar S. Stirling.	Sydney.
49	"	Reserve.....	1	Working.	"	
64, 65, 68	"	Lorway.....	3		"	
69	"	Emery	1		"	
8, 9	Clyde Coal Mining Co	Ontario	1½	Working.	John Sutherland.	Port Caledonia.
87	Cossit, Geo. G	"	1			
	General Mining Association..	Bridgeport	2			
	"	Sydney	5	Working.	{ Rich'd H. Brown { Cunard & Morrow	Sydney Mines. Halifax.
	"	"	12			
	"	"	5		Richard Wilson..	
27	"	Lingan	10	Working.	Donald Lynne ...	Lingan.
	"	"	4			

38, 39	"	"	Lingan	10		
10, 21	Gibson, John, et al .....	"	.....	2		
4, 12, 16	Glace Bay Mining Co.....		Glace Bay	3	Working.	{ E. P. Archbold . Halifax Little Glace Bay. <i>Henry Mitchell.</i>
75	Henry, W. A.....		.....	1		
22	Ingraham, R. J. and J. L.....		Halfway	1		
6, 13, 18, 19	International C. & R. Co.....		International.....	4	Working.	{ R. Belloni Cow Bay. <i>P. Johnstone...</i>
71	Jennings, Edward.....		.....	1		
47	LeCras & McInnes .....		.....	1		
66	Merchant's Bank of Canada.		Gardener	2		
74	Moore & Moseley .....		.....	1 $\frac{1}{4}$		
81	Morton, Lemuel J.....		.....	1		
80	McDonald, James .....		.....	1		
52, 53	McLeod, Hugh .....		.....	2		
88, 89, 90	Paint, Henry N. and others..		.....	3		
83, 85	Protheroe, Pryse.....		.....	2		
73, 82	Reid, Thos. S., (<i>sea area</i>).....		.....	2		
40, 41, 42	Ross, H. E., et al.....		.....	3		
79	Ross, W. J., et al., (<i>sea area</i>).		.....	1		
43	South Head Coal Co		South Head.....	1		
32	Sword, Wm., (<i>sea area</i>).....		.....	3		
54 to 63	Sydney C. M. Co., (<i>sea areas</i>).		.....	10		
46	Todd, A. Thornton		Collins	1	.....	George Scott
67	Weatherbe & Kirby .....		.....	1		
78	Weatherbe, R. L., (<i>sea area</i>)..		.....	5		
34, 35, 36	Victoria C. M. C., (<i>sea area</i>)..		Victoria	5		
50, 51	" .....		.....	2		
				130 $\frac{3}{4}$		

LIST OF COAL LEASES.—(CONTINUED.)

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
5	Aylmer, John Evans Freke..	INVERNESS CO. Cape Mabou..... Chimney Corner Port Hood Broad Cove	2	Working.	{ Alex. Wright... D. McKail ... }	Moncton. Broad Cove.
8	Evans, Thomas		1			
9	Evans, Thomas, (<i>see area</i>) ..		1			
7, 12	Inverness C. I. & R. Co.....		2			
13	Murray, George.....		3			
4	Richey, M. H., et al.....		1			
11	Ross, W. J.		1			
6	Ross, H. E. et al., (<i>see area</i>)..		1			
14, 15	Smyth, Peter.....		2			
10	Tremain, E. D., (<i>see area</i>) ..		1			
17	McDonald, Hugh		1			
			16			
2	Marmaud A. E.	RICHMOND CO. Little River	1			
		VICTORIA CO. New Campbellton. Black Rock	1			
2	Campbell, Chas. J.		3	Working.	John McDonald..	New Campbellton.
3, 4, 5	Ross, William		5			
			5			

Total area under lease.....255 $\frac{1}{4}$ square miles.

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	23,492	20,309	85,737	50,589	16,157	5,686	95	60	125,481	76,644
2nd Quarter	36,464	33,702	128,726	112,329	95,328	77,373	1,508	734	262,026	224,138
3rd Quarter	42,875	39,686	152,761	175,797	187,318	186,879	2,050	1,547	385,004	403,909
4th Quarter	40,254	40,974	94,587	96,207	124,081	110,910	1,577	1,877	260,199	249,963
Total	143,085	134,671	461,811	434,922	422,884	380,843	4,930	4,218	1,032,710	954,659
1879	99,222	90,671	388,486	330,878	295,984	262,924	4,579	4,151	788,271	688,624
1878	113,873	104,869	315,395	288,403	340,056	299,055	1,279	1,184	770,003	693,511
1877	107,004	99,078	306,477	284,155	340,416	301,981	3,599	1,851	757,496	687,065

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.		GRAND TOTAL.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia—											
Land sales.....	19,013	11,943	81,858	63,167	1,304	7,552	.....	.....	102,175	82,662	184,837
Sea-borne	529	13	53,476	10,112	99,269	2,453	2,224	.....	155,498	12,578	168,076
Nova Scotia—Total.....	19,542	11,956	135,334	73,279	100,573	10,005	2,224	.....	257,673	95,240	352,913
Quebec	33,241	256	140,019	1,468	63,276	656	175	.....	236,711	2,380	239,091
New Brunswick.....	85,285	22,968	3,507	1,506	24,435	116	.....	.....	73,227	24,590	97,817
Newfoundland.....	.....	.....	690	.....	67,931	201	804	.....	69,425	201	69,626
P. E. Island .....	.....	.....	13,463	26,747	5,600	645	312	.....	19,375	27,392	46,767
United States.....	1,423	.....	33,213	5,052	62,223	20,809	703	.....	97,562	25,861	123,423
West Indies .....	.....	.....	644	.....	11,521	.....	.....	.....	12,165	.....	12,165
Europe .....	.....	.....	.....	.....	10,544	2,313	.....	.....	10,544	2,313	12,857
Total.....	99,491	35,180	326,870	108,052	346,103	34,745	4,218	.....	776,682	177,977	954,659
1879	71,790	18,881	255,674	75,204	243,290	19,664	4,151	.....	574,905	113,719	688,624
1878	84,244	20,625	198,641	89,762	277,914	21,141	1,184	.....	561,893	131,528	693,511
1877	81,644	17,434	211,707	72,448	282,710	19,271	1,849	.....	576,910	109,155	687,065

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year. 1880.	Year 1879.
Nova Scotia.						
Land Sales ...	51,724	43,419	35,089	54,605	184,837	131,112
Sea-borne	7,732	31,421	67,050	61,873	168,076	147,008
N.Scotia—Total	59,456	74,840	102,139	116,478	322,913	278,120
Quebec	5,091	69,481	130,450	34,069	239,091	154,118
New Brunswick	9,266	22,919	36,651	28,981	97,817	84,731
Newfoundland .	120	19,138	31,945	18,423	69,626	57,651
P. E. Island ...	.....	6,679	21,664	18,424	46,767	44,891
United States...	2,405	27,973	73,987	19,058	123,423	51,641
West Indies....	306	1,172	2,332	8,355	12,165	10,124
South America.	.....	.....	.....	.....	.....	.....
Europe .....	.....	1,936	4,741	6,180	12,857	7,348
Total.....	76,644	224,138	403,909	249,978	954,659	688,624
1879...	58,123	163,508	259,817	207,176	688,624	688,624
1878...	65,516	173,929	271,279	182,787	693,511	693,511

COAL.—GENERAL STATEMENT.

1880.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....Tons...	125,481	76,644	23,476
2nd Quarter	262,026	224,138	22,753
3rd Quarter.....	385,004	403,909	25,340
4th Quarter.....	260,199	249,968	25,262
Total	1,032,710	954,659	96,831
1879.....	788,271	688,624	84,787
1878.....	770,603	693,511	88,627
1877.....	757,496	687,065	98,841

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDING DECEMBER 31ST, 1880.

COLLIERIES.	SEAMS.	PROD. E.	SALES.				COLLIERY CONSUMPTION.		
			Paving Royalty.	Frcs.	Total.	Per Centage.	Engines.	Workmen.	Per Centage.
CUMBERLAND COUNTY.									
Chignecto.....	North Seam.....	1,093	1,093	233	1,326	100	.....	.....	.....
Joggins.....	Joggins Main.....	15,350	9,727	1,474	11,201	84	1,486	124	12
Mundy.....	.....	303	101	202	303	.....	.....	.....	.....
Scotia.....	North Seam.....	432	432	118	550	100	100	.....	.....
Spring Hill.....	Black & South.....	127,907	85,358	35,553	121,291	93	4,777	1,777	4
PICTOU COUNTY.									
Acadia.....	Acadia.....	94,424	68,645	20,053	88,678	93	2,394	2,170	5
Albion Mines.....	Main & Dec.....	189,611	125,920	58,931	184,151	92	15,045	3,667	9
Intercolonial.....	Acadia.....	31,254	65,578	13,211	76,489	94	2,001	2,692	5
Vale.....	McBean.....	36,522	69,557	15,577	85,604	95	5,932	3,484	10
CAPE BRETON COUNTY.									
Block House.....	Block House.....	48,475	43,898	619	44,517	91	2,181	1,822	8
Caledonia.....	Phelan.....	18,539	18,539	3,731	22,120	100	785	637	7
Glace Bay.....	Harbour.....	24,371	23,988	2,452	26,440	100	3,908	1,028	16
Gowrie.....	McAulay.....	46,990	39,365	6,529	45,201	99	1,280	1,654	6
International.....	Harbour.....	63,131	53,866	5,031	56,897	100	1,410	1,129	5
Lingan.....	Lingan.....	31,758	25,424	2,475	27,897	87	2,076	817	8
Ontario.....	Phelan.....	8,695	6,029	1,832	7,852	92	410	519	8
Reserve.....	Phelan.....	37,621	26,759	4,855	31,614	84	1,605	1,213	7
Sydney Mines.....	Main.....	142,254	108,394	6,913	115,307	80	13,407	9,543	18
INVERNESS COUNTY.									
Broad Cove.....	.....	5	.....	.....	.....	.....	.....	.....	.....
VICTORIA COUNTY.									
New Campbellton.....	.....	4,925	4,213	.....	4,218	85	428	259	13
		1,032,710	776,682	177,977	954,659	.....	64,375	32,466	.....

Statement of the Number and Classes of Persons employed, and average results at each Colliery during the year ended December 31, 1880.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.		TOTAL.		AVERAGE NO. OF DAYS PER PERSON.		Average quantity raised per day.	HORSES.		PITS WORKED.	
	Cutters.	Laborers.	Boys.	Days' Labor.	Mechanics.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Persons.	Underground.	Surface.	Average No. of tons per cutter.		Average tons per day per Cutter.	Above.		Below.
Chignecto.. Cumberland	3	1	....	989	1	2	....	619	....	....	7	1,608	247	208	364	2.4	8	....	152
Joggins....	36	3	7	12,492	11	8	6	7,750	2	664	73	20,906	271	300	370	1.3	47	5	280
Scotia	2	....	....	572	....	2	....	238	....	....	4	810	286	119	216	1.3	2	....	160
Spring Hill.	138	50	58	58,971	27	51	13	18,647	2	351	339	77,969	239	205	926	3.9	542	3	236
Acadia.....Pictou	95	42	20	42,125	19	44	4	18,114	....	....	224	60,239	265	270	910	3.4	324	6	267
Albion.....	232	50	90	99,140	45	150	45	64,878	....	....	662	164,018	230	270	708	3.0	860	23	232
Intercolonial	98	46	39	38,468	25	36	6	19,820	5	1136	255	59,424	210	290	829	3.6	351	7	225
Vale	176	29	12	50,065	35	33	8	25,927	....	....	293	75,992	230	300	491	2.3	430	7	201
Block House	74	6	35	17,564	20	24	5	11,864	....	....	164	29,428	152	242	655	4.9	367	14	132
Caledonia	22	3	3	8,691	16	8	2	8,672	....	....	54	17,363	300	300	845	6.3	140	5	132
Glace Bay	47	2	5	8,702	17	10	4	7,865	....	....	85	16,567	161	253	518	3.0	138	4	176
Gowrie	80	9	27	20,766	13	22	11	11,169	....	....	162	31,935	179	244	587	3.7	292	5	157
International.....	75	8	31	25,424	15	35	3	11,835	....	....	167	37,259	223	223	84	5.8	438	2	144
Lingan	45	3	16	13,613	3	16	12	7,767	2	525	97	21,905	213	251	705	4.2	191	4	166
Ontario.....	12	4	2	3,527	7	13	2	4,765	....	....	40	8,292	140	216	723	4.4	53	2	162
Reserve	65	4	15	14,189	11	9	2	3,640	....	....	105	17,829	170	165	580	3.8	248	1	151
Sydney Mines	221	34	78	73,602	75	100	30	54,171	....	....	538	127,773	221	264	643	2.9	621	12	232
New Campbellton.. Vic.	25	8	5	5,331	5	14	4	3,935	....	....	....	9,366	141	166	197	1.7	26	4	184
Broad Cove...Inverness	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	1496	302	443	494,281	346	577	157	281,726	11	2676	3332	778,683	220	260	690	3.5	290	104	193

COLLIERY CONSTRUCTION ACCOUNT—1880.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machinery.	Colliery Build-ings.	Dwell-ings.	Surface Works.	Rail-ways.	Wharves.	Prospect-ing.	Total.
CUMBERLAND Co.											
Chignecto											
Joggins		1,691 92	1,226 00	4,000 00	85 50		85 00		16 00		7,104 42
Scotia											
Springhill					750 00	2,200 00	226 00	212 00			3,388 00
Pictou Co.											
Acadia		730 28		1,259 51	351 30						2,341 09
Albion Mines				31,665 15	5,589 55	520 78	78 20	7,984 00			45,838 35
Intercolonial		706 40		2,424 10	643 79			266 19	768 66		4,809 14
Vale										556 00	556 00
CAPE BRETON Co.											
Block House											
Caledonia											
Glace Bay											
Gowrie	50 00	4 00	566 00	200 00		500 00			480 00		1,800 00
International											
Lingan			287 00	1,709 37							
Ontario								300 00			1,996 37
Reserve			1,034 43								300 00
Sydney Mines											1,034 43
INVERNESS Co.											
Broad Cove			3 00								3 00
VICTORIA Co.											
New Campbellton										425 00	425 00
	\$50 00	3,132 60	3,116 43	41,258 13	7,420 14	3,220 78	389 20	8,762 86	1,264 66	981 00	69,595 80

Nova Scotia Coal Sales from 1785 to 1880 (inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.								
1785	1,668	14,349	1831	37,170	F'd. 368,196								
1786	2,000		1832	50,396	839,981								
1787	10,681		1833	64,743		1,533,798							
1788			1834	50,813			2,399,829						
1789			1835	56,434				4,927,339					
1790			1836	107,593					7,377,428				
1791			2,670	1837						118,942	17,446,571		
1792	2,143		1838	106,730						Total....			
1793	1,926		1839	145,962								Total....	
1794	4,405		1840	101,198									Total....
1795	5,320	1841	148,298	Total....									
1796	5,249	1842	129,708		Total....								
1797	6,039	1843	105,161			Total....							
1798	5,948	1844	108,482				Total....						
1799	8,947	1845	150,674					Total....					
1800	8,401	1846	147,506						Total....				
1801	5,775	1847	201,650								Total....		
1802	7,769	1848	187,643							Total....			
1803	6,601	1849	174,592									Total....	
1804	5,976	1850	180,084										Total....
1805	10,130	1851	153,499	Total....									
1806	4,938	1852	189,076		Total....								
1807	5,119	1853	217,426			Total....							
1308	6,616	1854	234,312				Total....						
1809	8,919	1855	238,215					Total....					
1810	8,609	1856	253,492						Total....				
1811	8,516	1857	294,198								Total....		
1812	9,570	1858	226,725							Total....			
1813	9,744	1859	270,293									Total....	
1814	9,866	1860	322,593										Total....
1815	9,336	1861	326,429	Total....									
1816	8,619	1862	395,637		Total....								
1817	9,284	1863	429,351			Total....							
1818	7,920	1864	576,935				Total....						
1819	8,692	1865	635,586					Total....					
1820	9,980	1866	558,520						Total....				
1821	11,388	1867	471,185								Total....		
1822	7,512	1868	453,624							Total....			
1823	27,000	1869	511,795									Total....	
1824		1870	568,277										Total....
1825		1871	596,418	Total....									
1826		12,600	1872		785,914								
1827		12,149	1873		881,106	Total....							
1828	20,967	1874	749,127		Total....								
1829	21,935	1875	706,795				Total....						
1830	27,269	1876	634,207					Total....					
		1877	697,065						Total....				
		1878	693,511							Total....			
		1879	688,626								Total....		
		1880	954,659									Total....	
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SUMMARY.

1785 to 1790....	14,349	1831 to 1840....	837,981
1791 " 1800....	51,048	1841 " 1850....	1,533,798
1801 " 1810....	70,452	1851 " 1860....	2,399,829
1811 " 1820....	91,527	1861 " 1870....	4,927,339
1821 " 1830....	140,820	1871 " 1880....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	98,173	24 ad.	1866	404,252	\$1.25
1851	116,274	"	1867	338,492	"
1852	87,542	"	1868	228,132	"
1853	120,764	"	1869	257,485	"
1854	139,125	Free.	1870	168,180	"
1855	103,222	"	1871	165,431	"
1856	126,152	"	1872	154,092	.75
1857	123,335	"	1873	264,760	"
1858	136,743	"	1874	138,335	"
1859	122,720	"	1875	89,746	"
1860	149,289	"	1876	71,634	"
1861	204,457	"	1877	118,216	"
1862	192,612	"	1878	88,495	"
1863	282,775	"	1879	51,641	"
1864	347,594	"	1880	123,423	"
1865	465,194	"			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably underestimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1880.

Showing the number of Mines at work, days' labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1880.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills Employed.	Steam Power.	Water Power.	Quartz, &c. Crushed.	Yield per Ton.		Maximum Yield per Ton.		Total Yield of Gold.		Average yield per man per day for 12 months at \$18.00 per oz.		
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.			
Caribou	3	5,418	3	3	...	824	1	0	3	12	16	823	5	19	2.55
Gay's River	1	189	1	...	1	40	0	8	0	4	6	13	6	6	1.24
Montague	5	22,144	2	2	...	1,221	3	9	9	13	0	4,270	8	17	3.47
Oldham	2	2,205	2	1	1	1,475	0	11	7	3	14	829	4	17	6.75
Renfrew	1	796	1	...	1	537	0	5	4	5	0	155	14	13	3.50
Sherbrooke	12	36,240	7	4	3	6,465	0	12	5	10	0	4,042	7	9	2.07
Stormont	1	3,261	...	...	...	175	1	19	2	1	20	346	12	0	1.91
Tangier	3	13,343	3	1	2	790	0	13	2	13	8	530	14	3	.70
Uniacke	4	10,316	3	2	1	1,505	0	15	3	3	11	1,161	16	12	2.02
Waverley	2	3,274	3	1	2	346	0	9	3	2	12	156	13	15	.85
Wine Harbor	1	1,262	2	1	1	161	0	7	3	0	0	61	12	0	.87
Unproclaimed	3	5,378	5	1	4	498	1	13	3	2	9	842	4	13	2.81
	38	103,826	32	16	16	14,037	0	18	9	13	0	13,234	0	4	2.18

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARIBOU.						GAY'S RIVER.						MONTAGU.								
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Gr.
January .....	...	.....	.....	225	137	5	20	...	.....	...	...	...	...	...	4	1,062	41	50	216	18	0
February .....	...	.....	.....	7	4	8	0	...	.....	...	...	...	...	...	3	1,168	45	154	724	10	10
March .....	...	.....	.....	28	38	9	18	...	.....	...	2	0	...	...	5	1,604	61	34	243	...	...
April	3	341	13	117	106	10	15	1	15	1	...	1	1	19	6	1,311	50	124	725	1	3
May	4	515	20	78	82	15	4	1	7	1	...	...	14	18	4	1,110	42	37	178	2	...
June	6	1,156	44	45	64	2	11	2	58	3	...	...	...	...	4	1,209	47	83	477	13	5
July	4	551	21	15	14	9	15	...	.....	...	10	2	13	1	6	2,300	88	25	73	3	...
August	4	403	15	61	72	7	4	1	2	...	8	2	16	13	7	1,933	74	122	845	13	11
September	4	507	20	87	81	19	7	1	14	1	10	2	18	0	9	1,890	72	175	28	11	...
October	6	671	26	81	138	7	14	...	6	...	...	...	...	...	7	3,163	121	175	497	5	7
November	6	463	18	86	69	7	22	1	39	1	...	1	5	4	7	3,001	119	148	133	8	20
December	6	811	30	14	13	2	10	1	48	1	10	1	7	10	4	2,393	89	94	127	2	9
	3	5,418	...	824	823	5	19	1	189	...	40	13	6	6	5	22,144	....	1,221	4,270	8	17

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued.)

MONTH.	OLDHAM.						RENFREW.						SHERBROOKE.								
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January.....	2	100	4	295	116 11	5	.....	.....	.....	.....	.....	.....	.....	.....	14	4104	157	641	427	6	0
February.....	2	189	7	203	150 11	2	.....	.....	.....	.....	112	53	0	12	13	3648	140	940	468	0	7
March	2	202	8	173	91 3	17	.....	.....	.....	.....	8	2	10	0	12	3456	133	503	408	4	0
April	1	70	3	55	79 16	14	.....	.....	.....	4	88	24	0	0	9	2470	91	500	383	4	0
May	2	162	7	364	142 10	14	.....	.....	43	2	95	27	8	1	8	2340	90	463	338	7	0
June	2	113	4	62	65 3	15	.....	.....	140	5	52	15	6	0	13	2600	100	326	258	18	0
July.....	1	98	3	65	24 4	17	.....	.....	81	3	.....	.....	.....	.....	14	3348	128	810	423	5	16
August	2	175	9	9	6 5	12	.....	.....	47	2	.....	.....	.....	.....	13	3276	126	360	263	13	0
September.....	3	255	9	28	25 14	18	.....	.....	55	2	.....	.....	.....	.....	14	3328	127	572	356	18	12
October	3	142	5	10	6 13	12	.....	.....	221	8	.....	.....	.....	.....	13	2522	95	560	365	10	0
November.....	3	299	11	209	117 14	11	.....	.....	604	23	90	16	10	0	12	2340	90	529	185	0	14
December	3	400	15	2	2 15	0	.....	.....	496	19	92	17	0	0	12	2808	110	261	164	0	8
	2	2205	....	1475	829 4	17	.....	.....	796	....	537	155 14	13		12	36240	....	6465	4042	7	9

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued.)

MONTH.	STORMONT.							TANGIER.							UNIACKE.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January.....	1	282	10	...	...	...	...	5	794	30	95	69	10	0	4	458	17	32	20	12	0
February.....	1	296	11	...	...	...	...	5	882	33	103	43	14	0	4	782	30	126	72	5	0
March.....	1	387	14	...	...	...	...	5	893	33	138	69	14	11	5	1071	41	32	20	12	0
April.....	1	361	13	...	...	...	...	3	735	28	66	23	16	6	3	692	26	177	119	2	12
May.....	1	244	9	...	...	...	...	3	1088	41	18	18	9	1	4	833	32	123	106	11	0
June.....	1	195	8	105	168	12	0	3	1301	50	20	5	1	0	4	836	32	139	168	14	0
July.....	2	335	12	...	...	...	...	3	1241	47	31	46	2	3	3	1645	63	180	122	2	0
August.....	1	297	11	...	...	...	...	3	1378	52	12	13	10	14	2	780	30	93	43	8	0
September.....	2	343	13	...	...	...	...	3	470	18	19	54	6	0	5	1610	63	227	212	14	0
October.....	1	279	10	...	...	...	...	3	1455	56	126	52	11	7	5	495	19	135	95	14	0
November.....	1	202	8	...	...	...	...	3	1581	60	115	27	12	10	4	555	29	196	150	6	0
December.....	1	40	1	70	178	0	0	3	1525	60	47	105	16	23	4	459	17	45	29	16	0
	1	3261	...	175	346	12	0	3	13343	...	790	530	14	3	4	10316	...	1505	1161	16	12

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(Continued.)

MONTH.	WAVERLEY.						WINE HARBOR.						UNPROCLAIMED.								
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January.....	1	356	21	15	3	19	11	..	.....	...	14	8	10	0	2	311	12	25	37	11	6
February.....	1	114	4	...	...	...	...	..	.....	...	...	...	...	...	2	309	12	...	...	...	...
March.....	1	231	8	33	11	5	0	..	.....	...	...	...	...	...	2	295	15	55	41	1	9
April.....	2	167	6	32	13	0	0	..	.....	...	31	14	11	0	2	395	15	4	0	8	12
May.....	2	137	5	6	20	3	12	..	178	6	22	7	10	0	5	499	19	25	23	7	22
June.....	2	184	7	31	17	8	0	..	.....	...	23	8	9	0	5	718	29	151	342	12	19
July.....	1	120	4	38	9	17	4	2	443	13	...	...	...	...	4	534	20	8	24	11	11
August.....	1	238	9	62	25	5	0	2	122	4	36	12	12	0	3	512	19	65	46	4	0
September.....	2	348	13	55	15	11	0	1	97	3	...	...	...	...	3	512	19	68	45	11	14
October.....	2	436	13	38	22	19	0	1	255	9	29	8	5	0	2	191	8	4	0	11	6
November.....	2	471	14	30	15	10	12	1	80	3	...	...	...	...	4	450	13	93	282	16	10
December.....	2	472	14	6	1	15	0	1	87	3	6	1	15	0	4	514	20	..	...	...	...
	2	3274	....	346	156	13	15	1	1262	...	161	61	12	0	3	5378	..	498	842	4	13

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A Day.	A Year.
1862	7,275			6,473	1	2	11	156,000	\$ 83	\$249
1863	14,001	14	17	17,002		16	11	273,624	92	276
1864	20,022	18	13	21,434		18	16	252,720	1 42	426
1865	25,454	4	8	24,423	1	0	20	212,966	2 15	645
1866	25,204	13	2	32,161		15	2	211,796	2 14	642
1867	27,314	11	11	31,386		17	9	218,894	2 24	672
1868	20,541	6	10	32,262		12	17	241,462	1 53	459
1869	17,868	0	19	35,147		10	4	210,938	1 52	456
1870	19,866	5	5	30,829		12	21	173,680	2 05	615
1871	19,227	7	4	30,791		12	11	162,994	2 12	636
1872	13,094	17	6	17,093		15	7	112,476	2 09	627
1873	11,852	7	19	17,708		13	9	93,470	2 28	684
1874	9,140	13	9	13,844		13	5	77,246	2 12	636
1875	11,208	14	19	14,810		15	4	91,698	2 20	660
1876	12,038	13	18	15,490		15	13	111,304	1 94	582
1877	16,882	6	1	17,369		19	10	123,565	2 46	738
1878	12,577	1	22	17,990		13	23	110,422	2 05	615
1879	13,801	8	10	15,936		17	8	92,002	2 34	702
1880	13,234	0	4	14,037		18	20	103,826	2 18	654
Total.	310,606	5	5	396,185	.....			3,030,883	.....	.....

DISTRICT SUMMARY.

CARRIBOU.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average yield per man per day, in dwts. at \$0.90.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		Dwts.	
1869	1,001	0	23	1,583		12	17	11,076	1.80	1 62
1870	613	11	2	755		16	6	6,500	1.88	1 64
1871	504	15	23	479	1	1	1	2,964	3.40	3 06
1872	209	15	0	368		11	9	2,184	1.92	1 72
1873	17	16	12	21		16	23	312	1.14	1 02
1874	368	10	23	333	1	2	3	4,651	1.58	1 42
1875	446	12	19	368	1	4	6	3,675	2.43	2 18
1876	727	4	10	542	1	6	11	6,000	2.39	2 15
1877	2,596	13	23	1,735	1	9	21	14,579	3.56	3 20
1878	1,026	12	16	928	1	2	2	9,188	2.23	2 01
1879	676	1	21	781		17	7	7,648	1.77	1 60
1880	823	5	19	824	1	0	0	5,418	2.83	2 55

MONTAGUE.

YEAR.	Total ounces of Gold extracted.	Stuff Crushed.	Yield per Ton of 2,000 lbs.	Total Days' Labor.	Average yield per man per day, in dwts. at \$0.90.	
	Oz. Dwt Gr.	Tons.	Oz. Dwt. Gr.		Dwts.	\$
1863	336 14 16	140	2 16 2	38,688	.18	16
1864	1,052 19 14	545	1 18 15	11,492	1.83	1 64
1865	902 12 13	615	1 9 8	12,376	1.45	1 30
1866	496 15 10	382	1 6 0	6,032	1.64	1 47
1867	436 15 16	244	1 15 11	7,826	1.11	99
1868	584 14 22	350	1 13 0	7,834	1.58	1 42
1869	805 13 14	572	1 8 3	8,944	1.80	1 62
1870	3,831 9 5	916	4 3 14	15,106	5.06	4 55
1871	3,152 8 15	848	3 14 8	15,938	3.95	3 55
1872	1,793 10 6	683	2 12 12	13,832	2.59	2 33
1873	1,440 3 9	679	2 2 9	10,972	3.62	2 35
1874	655 0 22	496	1 6 10	5,452	2.40	2 16
1875	287 18 17	72	3 19 23	2,526	2.27	2 05
1876	149 1 17	81	1 16 19	1,404	2.83	2 38
1877	50 1 9	55	18 5	1,405	.71	64
1878	158 6 12	192	16 12	2,065	1.53	1 37
1879	1,527 10 20	485	3 3 0	4,483	6.81	6 13
1880	4,270 8 17	1221	3 9 22	22,144	3.85	3 47

OLDHAM.

1862	51 0 0	84	12 3	4,368	.23	\$ 20
1863	1,223 3 21	1,026	1 4 6	25,896	.94	84
1864	1,750 5 12	2,238	15 11	37,934	.94	84
1865	1,126 11 20	2,236	10 1	18,278	1.23	1 10
1866	956 12 20	966	19 19	11,362	1.68	1 51
1867	1,100 3 14	870	1 5 7	15,418	1.42	1 27
1868	719 0 4	1,012	14 4	8,008	1.79	1 61
1869	1,394 16 0	1,735	16 1	17,576	1.58	1 42
1870	2,051 15 3	2,644	15 12	20,254	2.02	1 81
1871	1,718 12 12	1,374	1 4 4	13,494	2.54	2 28
1872	1,014 11 10	793	1 5 14	8,580	2.36	2 12
1873	998 2 17	662	1 10 3	6,994	2.85	2 46
1874	665 8 11	527	1 5 6	3,420	3.86	3 27
1875	915 8 3	550	1 13 6	6,100	3.00	2 70
1876	1,953 5 23	1,705	1 2 21	15,757	3.47	2 22
1877	2,527 19 13	2,015	1 5 2	14,144	3.57	3 21
1878	1,737 9 9	1,808	19 5	10,599	3.27	2 95
1879	1,600 17 0	1,787	17 22	5,322	6.00	4 41
1880	829 4 17	1,475	11 5	2,205	7.50	6 75

RENFREW.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average yield per man per day, in dwts. at \$0.90.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		Dwts.	\$
1862	308	8	0	171	1	15	10	10,920	.56	50
1863	785	7	7	575	1	7	7	21,216	.74	66
1864	1,172	6	5	1,229		19	1	12,220	1.91	1 71
1865	1,008	10	18	927	1	1	18	14,430	1.39	1 25
1866	6,423	15	11	6,003	1	1	9	38,142	3.36	3 02
1867	7,904	19	2	7,222	1	2	4	61,308	2.57	2 31
1868	3,373	14	9	5,994		11	6	39,598	1.70	1 53
1869	3,097	15	7	7,258		8	12	34,606	1.79	1 61
1870	1,171	18	11	3,243		7	2	11,310	2 07	1 86
1871	1,179	17	16	2,463		9	4	10,972	2.15	1 93
1872	323	3	8	855		7	13	5,668	1.14	1 02
1873	59	16	18	255		4	16	2,028	.59	53
1874	3	3	7	10		6	7	190	.33	29
1875	47	16	6	113		8	11	690	1.38	1 24
1876	75	14	10	164		9	5	1,307	1.15	1 03
1877	207	13	4	294		14	3	3,543	1.19	1 05
1878	155	17	10	380		8	5	1,769	1.76	1 58
1879	104	1	20	419		5	0	734	2.93	2 64
1880	155	14	13	537		5	19	796	2.77	3 50

SHERBROOKE.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average yield per man per day, in dwts. at \$0.90.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		Dwts.	\$
1862	2,023	0	0	663	3	1	0	22,464	1.80	\$1 62
1863	3,304	14	12	3,454		19	8	31,200	2.11	1 89
1864	3,419	14	20	2,673	1	6	8	32,630	2.09	1 88
1865	3,424	1	21	2,511	1	7	6	23,010	2.97	2 67
1866	5,829	13	8	2,853	2	0	20	22,490	5.18	4 66
1867	9,463	18	0	7,378	1	5	15	35,958	5.31	4 78
1868	7,070	0	5	9,880		14	7	59,540	2.37	2 13
1869	5,546	11	16	11,500		9	15	41,964	2.64	2 37
1870	7,134	4	0	11,428		12	11	48,880	2.91	2 61
1871	6,579	19	7	13,882		9	9	50,856	2.58	2 32
1872	4,188	9	21	5,243		15	17	38,246	2.21	1 98
1873	5,026	0	4	7,187		15	9	31,460	3.19	2 87
1874	4,037	1	2	5,430		14	20	31,199	2.58	2 32
1875	5,818	15	10	6,443		18	1	38,683	3.00	2 70
1876	5,176	15	15	6,205		16	16	37,269	2 77	2 49
1877	8,237	3	10	8,654		19	1	47,725	3.45	3 10
1878	6,843	1	15	9,340		14	17	50,827	2.69	2 42
1879	7,389	17	15	9,209		16	1	44,965	3.30	2 97
1880	4,042	7	9	6,465		12	12	36,240	2.23	2 07

STORMONT.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.	Total Days' Labor.	Average yield per man per day, in dwt. at \$0.90.	
	Oz.	Dwt.	Gr.		Oz. Dwt. Gr.		Dwts.	
1862	397	0	0	197	2 0 7	12,792	.62	\$ 55
1863	1,587	13	12	526	3 0 7	15,600	2.03	1 82
1864	1,510	4	21	636	2 7 11	25,844	1.16	1 04
1865	1,696	6	2	1,040	1 11 14	25,350	1.29	1 16
1866	1,254	17	9	2,253	11 2	11,208	2.23	2 00
1867	1,266	16	15	782	1 11 2	12,428	2.03	1 82
1868	673	2	17	596	1 2 14	14,560	.92	82
1869	227	0	13	590	7 16	6,110	.74	66
1870	578	5	15	1,525	7 13	6,552	1.76	1 58
1871	559	7	21	1,937	5 18	5,590	2.00	1 80
1872	472	0	11	543	17 9	4,316	2.18	1 96
1873	37	18	5	181	4 4	832	.91	81
1874	167	19	20	236	14 5	1,799	1.86	1 67
1875	267	6	18	620	8 14	2,543	2.10	1 89
1876	267	0	5	370	14 10	3,607	1.48	1 33
1877	240	19	0	96	2 10 4	3,310	1.45	1 30
1878	106	10	0	74	1 8 19	3,015	.71	64
1879	198	15	0	124	1 11 6	3,447	1.14	1 03
1880	347	12	0	175	1 19 7	3,261	2.12	1 91

TANGIER.

1862	865	0	0	707	1 4 11	39,000	.44	39
1863	494	7	21	655	15 2	37,440	.26	23
1864	602	7	8	698	18 10	16,380	.74	66
1865	644	7	13	639	1 0 4	13,156	.97	87
1866	296	5	21	791	7 11	9,074	.65	58
1867	691	1	7	724	19 2	6,864	2.01	1 80
1868	921	8	9	725	1 4 7	11,700	1.57	1 35
1869	1,192	3	10	1,332	17 21	15,938	1.49	1 34
1870	1,814	2	10	2,732	13 6	29,328	1.23	1 11
1871	2,095	0	7	2,924	14 7	27,326	1.53	1 38
1872	829	8	15	1,622	10 5	10,426	1.59	1 43
1873	726	11	15	1,070	13 4	8,892	1.63	1 46
1874	419	7	5	706	11 21	5,092	1.64	1 47
1875	448	2	15	1,106	8 1	6,667	1.34	1 21
1876	312	13	0	716	10 6	8,274	.92	82
1877	410	14	15	364	1 2 13	5,102	1.61	1 42
1878	584	10	22	1,035	11 7	10,146	1.15	1 03
1879	857	7	12	1,464	10 6	9,267	1.84	1 66
1880	530	14	3	790	13 10	13,343	.80	70

UNIACKE.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average yield per man per day, in dwts. at \$0.90.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		Dwts.	\$
1866	72	16	9	28	2	12	0	1,326	1.09	98
1867	1,622	13	20	1,968	16	12		14,274	2.27	2 04
1868	3,247	3	17	3,874	16	16		27,898	2.32	2 08
1869	1,867	3	12	3,172	11	18		22,022	1.69	1 52
1870	566	14	5	1,794	6	7		6,214	1.82	1 63
1871	360	17	3	900	8	0		4,342	1.66	1 49
1872	241	10	0	364	13	7		1,950	2.47	2 22
1873	129	8	18	198	13	1		1,222	2.52	2 26
1874	14	1	0	19	14	19		60	4.68	3 81
1875	139	3	3	319	8	17		2,643	1.05	94
1876	227	14	10	321	14	4		4,752	.96	86
1877	663	15	9	470	1	8	6	7,252	1.83	1 64
1878	629	5	7	704	17	21		5,711	2.20	1 98
1879	787	18	0	744	1	1	4	7,775	2.02	1 82
1880	1,161	16	12	1,505	15	10		10,316	2.24	2 02

WAVERLEY.

1862	1,507	0	0	3,741	8	1	46,800	.66	\$ 59
1863	2,380	6	3	6,755	7	1	58,344	.81	72
1864	6,410	4	22	9,238	13	23	88,244	1.44	1 29
1865	14,404	4	9	12,518	1	3	87,308	3.29	2 96
1866	8,612	17	11	16,750	10	6	98,800	1.74	1 56
1867	3,942	5	2	10,510	7	12	46,436	1.69	1 52
1868	2,387	8	22	6,372	7	11	26,972	1.26	1 13
1869	1,591	14	10	3,915	8	3	16,796	1.89	1 70
1870	811	3	21	2,619	6	4	13,546	1.19	1 07
1871	1,427	18	12	2,772	10	6	17,472	1.62	1 45
1872	1,047	17	0	1,761	11	21	12,766	1.64	1 47
1873	1,009	0	0	2,013	10	0	13,520	1.49	1 34
1874	1,553	12	15	1,682	18	11	12,541	2.47	2 22
1875	1,740	1	0	1,313	1	6	18,807	1.85	1 66
1876	1,539	7	0	1,661	18	12	21,107	1.45	1 30
1877	866	18	10	1,422	12	4	14,261	1.21	1 09
1878	498	12	8	1,197	8	8	6,727	1.48	1 33
1879	116	11	1	442	5	7	2,922	.78	71
1880	156	13	15	346	9	1	3,274	.94	85

WINE HARBOR.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average yield per man per day, in dwt. at \$0.90.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		Dwts.	
1862	1,688	0	0	835	2	0	10	12,792	2.63	\$2 36
1863	3,718	2	19	3,644	1	0	10	36,688	2.05	1 81
1864	4,033	3	7	4,136		19	12	22,984	3.50	3 15
1865	2,200	5	14	3,833		11	11	16,588	2.65	2 38
1866	1,012	8	4	1,881		10	18	8,814	2.29	2 06
1867	845	18	14	1,670		10	3	13,390	1.26	1 13
1868	1,248	6	3	2,938		8	12	23,166	1.00	90
1869	719	8	19	2,726		5	6	20,462	.70	63
1870	914	15	14	2,356		7	17	8,034	2.27	2 04
1871	1,538	6	16	2,927		10	4	11,232	2.74	2 46
1872	2,572	10	18	2,305	1	2	7	8,840	5.82	2 23
1873	2,000	0	3	2,267		17	15	12,688	3.15	2 83
1874	633	11	6	1,193		10	14	5,605	2.26	2 03
1875	495	11	22	1,140		8	15	3,942	2.49	2 24
1876	1,217	19	7	1,929		12	15	7,848	3.10	2 79
1877	580	14	3	1,068		10	21	5,772	2.01	1 80
1878	492	13	12	814		12	2	4,471	2.20	1 98
1879	427	5	6	424	1	0	0	3,161	2.66	2 40
1880	61	12	0	161		7	10	1,262	.95	87

OTHER DISTRICTS.

1862	436	0	0	75	5	19	10	6,864	1.26	\$1 13
1863	141	3	2	225		12	13	6,552	.43	38
1864	66	12	0	38	1	15	0	4,992	.27	24
1865	47	3	8	102		9	6	2,470	.38	34
1866	248	10	19	250		19	23	4,550	1.09	98
1867	36	6	17	16	2	9	3	4,992	.15	13
1868	316	6	22	518		12	5	12,636	.50	45
1869	424	12	15	761		11	3	15,444	.54	48
1870	378	5	15	812		9	7	7,956	.95	85
1871	112	2	16	281		8	0	2,808	.79	71
1872	402	0	13	2,552		3	3	5,668	1.41	1 26
1873	407	9	13	3,175		2	13	4,550	1.79	1 61
1874	622	16	19	3,212		3	21	7,327	1.70	1 53
1875	604	18	2	2,766		4	9	5,422	2.23	2 00
1876	331	17	17	1,796		3	14	3,978	1.67	1 50
1877	499	13	1	1,196		8	8	6,473	1.54	1 39
1878	344	2	7	1,517		4	13	5,904	1.16	1 04
1879	74	2	22	57	1	6	0	1,242	1.11	1 00
1880	842	4	13	498	1	13	10	5,378	3.12	2 81

Statement of Coals (in tons) received at the following Stations on the Intercolonial Railway, from Mines in Nova Scotia, for the Year ending 31st December, 1880.

STATIONS.	QUANTITY.	STATIONS.	QUANTITY.
Halifax	54,979	<i>Brot. for</i>	254,881
Bedford	187	Memramcook	120
Windsor Junction	3,902	Painsec	6
Wellington	56	Shediac	88
Enfield	90	Point DuChene	44
Elmsdale	86	Moncton	2,966
Milford	78	Salisbury	572
Shubenacadie	290	Petitcodiac	84
Stewiacke	168	Penobsquis	46
Brookfield	62	Sussex	464
Truro	5,407	Apohaqui	12
Valley	6	Norton	18
Riversdale	16	Passekeag	12
West River	16	Hampton	280
Glengarry	10	Rothsay	252
Hopewell	92	Cold Brook	426
New Glasgow	4,596	St. John	6,176
Pictou Landing	110,874	Berry's Mills	6
Belmont	12	Weldford	30
DeBert	6	Chatham	270
Londonderry	51,898	Newcastle	32
Wentworth	18	Bathurst	18
Greenville	26	New Mills	6
Thomson	48	Charlo	18
Oxford	258	Campbellton	194
Athol	18	Rimouski	382
Maccan	12	St. Flavie	10
Amherst	2,096	Riviere DuLoup	46
Aulac	96	Chaudiere	8,256
Sackville	996	Point Levi	1,990
Dorchester	18,482	Flags	950
	254,881	Total	278,655

INTERCOLONIAL RAILWAY.

Statement showing the quantities (in tons) of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway during the year 1880.

MONTHS.	Acadia.	ALBION.			Drummond.	Vale.	Spring Hill.
		Round.	Small.	Coke.			
January .....	.....	2,256	23	20	.....	.....	4,721
February .....	.....	2,021	.....	.....	.....	.....	3,768
March .....	.....	476	10	.....	1,061	.....	3,428
April	95	.....	19	.....	1,620	.....	4,222
May .....	.....	.....	81	.....	1,596	.....	5,351
June	30	53	18	10	1,048	50	4,499
July .....	.....	986	24	.....	54	.....	7,134
August .....	.....	1,535	48	.....	.....	.....	8,266
September .....	.....	1,136	.....	20	.....	.....	5,029
October	16	1,186	43	.....	.....	160	5,600
November	9	659	65	.....	.....	1,751	7,585
December .....	.....	.....	67	.....	.....	2,070	8,196
	150	10,308	398	50	5,379	4,031	67,799

*General Storekeeper's Office,
Moncton, N. B., January 24th, 1881.* }

T. V. COOKE,
General Storekeeper.

From the following Stations.

STATIONS.	Quantity.
New Glasgow	95,085
Stellarton	125,373
Spring Hill	36,725
Maccan	892
Albion	7,320
Drummond	13,240
Nappan	20
	278,655

. & O. E.

Moncton, N. B., 28th January, 1881.

J. J. WALLACE,
Traffic Auditor.

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

GYPSUM EXPORTS—Tons of 2,000 lbs.

Windsor	Tons.	72,660	Value	\$41,697
Cheverie	"	37,823	"	27,072
Walton	"	4,780	"	3,742
Hantsport	"	8,825	"	7,810
Baddeck	"	4,440	"	3,800
Wallace*	"	60	"	60
		128,588	\$84,181	

MANGANESE EXPORTS.

Windsor	Tons.	62	Value	\$2,831
Walton	"	81	"	3,600
Cheverie	"	10	"	100
Other Places	"	70	"	1,400
		223	\$7,931	

MANUFACTURED STONE.

Seaman's Cove, Cumberland County.

Messrs. Seaman—Grindstones...	Tons.	1,400	Value	\$16,800
Whetstones ...	Boxes.	2,000	"	2,000
*Grindstones ...	Tons.	100	"	1,400
				\$20,200

BUILDING STONE.

*Antigonish	Tons.	40	Value	\$ 20
Wallace	"	3,000	"	15,000
*Wallace	"	500	"	1,000
				\$16,020

* Newfoundland and the Dominion.

IRON MINING.

Average force Employed Daily.

Below Ground—Miners	59
" Laborers	69
" Boys.....	7
Above Ground—Mechanics	7
" Laborers	21
" Boys.....	3
	<hr/>
	166

MANGANESE.

Average number of Men employed..... 20

FINANCIAL STATEMENT.—GOLD.

Mines Department for Twelve Months ended December 31st, 1880.

DISTRICTS.	RECEIPTS.				EXPENDITURE.			
	Rents.	Royalty.	Sites.	Totals.	Return Rents.	Royalty Commission.	Salaries and Surveys.	Totals.
Caribou.....	\$214 00	\$421 84	.....	\$635 84	\$8 00	\$22 95	.....	\$30 95
Fifteen Mile Stream.....	1144 00	238 14	.....	1382 14	108 00	10 62	\$40 37	158 99
Gay's River.....	10 00	11 68	.....	21 68	.....	51	.....	51
Lawrencetown.....	268 00	95	.....	268 95	18 00	.....	.....	18 00
Montagu.....	1350 00	1641 53	.....	2991 53	118 00	81 65	.....	199 65
Oldham.....	56 00	358 62	.....	414 62	.....	23 59	12 00	35 59
Ovens.....	50 00	.....	.....	50 00	.....	.....	.....	.....
Renfrew.....	32 00	59 38	.....	91 38	2 00	4 46	6 00	12 46
Sherbrooke.....	96 00	1666 28	.....	1762 28	.....	95 46	720 00	815 46
Stormont.....	278 00	64 08	15 00	357 08	.....	.....	.....	.....
Tangier.....	54 00	162 56	.....	216 56	.....	4 04	.....	4 04
Uniacke.....	548 00	446 23	.....	994 23	.....	26 52	50 00	76 52
Wagamatkook.....	58 00	.....	.....	58 00	.....	.....	.....	.....
Waverley.....	2 00	68 42	.....	70 42	.....	1 14	.....	1 14
Wine Harbour.....	2 00	35 47	.....	37 47	.....	1 77	.....	1 77
Unproclaimed, &c.....	3058 00	22 86	.....	3080 86	38 00	.....	193 23	231 23
Prospecting Licenses.....	.....	.....	.....	5031 87	.....	.....	.....	75 91
	\$7220 00	\$5198 04	\$15 00	\$ 17464 91	\$292 00	\$272 71	\$1021 60	\$1662 22

OTHER THAN GOLD.

Mines Department for Twelve Months ended December 31st, 1880.

COUNTIES.	RECEIPTS.				EXPENDITURE.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Return Licenses to Search.	Return Licenses to Work.	Totals.
Annapolis	\$40 00	\$50 00	.....	\$90 00	\$20 00	.....	\$20 00
Antigonish	160 00	.....	.....	160 00	.....	.....	.....
Cape Breton.....	640 00	225 00	\$16091 32	16956 32	.....	.....	.....
Colchester	60 00	.....	.....	60 00	.....	.....	.....
Cumberland	360 00	.....	9822 47	10182 47	.....	.....	.....
Digby.....	40 00	.....	.....	40 00	.....	.....	.....
Guysborough.....	360 00	.....	.....	360 00	.....	.....	.....
Halifax	460 00	.....	.....	460 00	.....	.....	.....
Hants.....	60 00	.....	.....	60 00	.....	.....	.....
Inverness.....	640 00	100 00	.....	740 00	20 00	.....	20 00
Kings.....	.....	50 00	.....	50 00	20 00	.....	20 00
Lunenburg	40 00	.....	.....	40 00	.....	.....	.....
Pictou	200 00	.....	23151 82	23351 82	.....	.....	.....
Richmond	40 00	25 00	.....	65 00	.....	.....	.....
Shelburne	20 00	.....	.....	20 00	.....	.....	.....
Victoria	180 00	100 00	.....	280 00	20 00	.....	20 00
Yarmouth.....	60 00	.....	.....	60 00	.....	.....	.....
	\$3360 00	\$550 00	\$49065 61	\$52975 61	\$80 00	.....	\$80 00

ABSTRACT ACCOUNT.

Receipts and Expenditures for the Twelve Months ended December 31st, 1880.

RECEIPTS.	EXPENDITURE.
Licenses to Search Coal..... \$3,360 00	Return Licenses to Search..... \$80 00
" Work Coal..... 550 00	Return Rents \$292 00
Royalty 49,065 61	Royalty Commission 272 71
Rents..... Gold..... \$7,220 00	Salaries and Surveys 1021 60
Royalty 5,198 04	Return Prospecting Licenses..... 75 91
Mill Sites..... 15 00	General Expenses..... \$4376 04
Prospecting Licenses..... 5,031 87	Postage 88 10
17,464 91	Stationery and Printing..... 270 53
\$70,440 52	\$6476 89

REPORT
OF THE
DEPARTMENT OF MINES
NOVA SCOTIA,
FOR THE YEAR 1881.



HALIFAX, N. S. :
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER
1882.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1881.

*To His Honor the Honorable ADAMS GEORGE ARCHIBALD, C. M. G.
Lieut.-Governor of the Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR:—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled by him from official and other returns made to the Department of Mines, in the year 1881.

SAML. CREELMAN.
Commissioner of Public Works and Mines.

HALIFAX, February, 10, 1881.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, JR., A. M., F. G. S.,

INSPECTOR OF MINES,

(*Member of the North of England Institute of Mining Engineers.*)

OFFICE OF INSPECTOR OF MINES,

Halifax, Feb. 26th, 1882.

THE HON. SAMUEL CREELMAN, M. L. C., M. E. C.,

Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following Report on the various Mining industries of the Province, carried on during the past year.

In addition to a detailed notice of the operations at each Mine, and the usual statistical tables, I submit a summary of the amount of minerals exported, not paying Royalty to your honorable Government.

The following summary shows, so far as I have been able to learn, the extent of the mineral production of Nova Scotia during the year 1881, compared with that of the previous year.

	1880.	1881.
Gold Ounces	13,234.....	10,756
Iron Ore Tons	51,193.....	39,843
Maganese Ore.... "	223.....	231
*Coal raised..... "	1,032,710.....	1,124,270
†Gypsum..... "	128,528.....	107,133
†Building stone... "	3,540.....	6,638
†Barytes .. ..... " ....	.....	40
Coke Made..... "	13,125.....	27,871
Fireclay..... "	75.....	401
Grindstones, etc .. "	1,500.....	1,680

Through the kindness of the Collectors of Customs at the ports specified, I am enabled to give further details under this head at the end of the Report.

* Ton of 2,240 lbs.

† Quantities shipped. Amounts used in Nova Scotia unknown. No return sent of Plaster shipped from Baddeck.

COAL TRADE.

The total sales for the year 1881 amount to 1,035,014 tons, against 954,659 tons in 1880, being an increase of 80,355 tons.

The most noticeable points in the trade were an increase of 59,430 tons in the home sales, the returns showing 382,343 tons against 322,913 tons in 1880. The coal sent to the Province of Quebec amounted to 268,628 tons, an increase of 29,537 tons over the preceding year.

The sales to New Brunswick show an increase of 25,709 tons.

The sales to Newfoundland fell off 7,452 tons. A slight decrease is noticeable in the quantity exported to Prince Edward Island.

The amount exported to the United States was 9,695 tons less than in 1880.

The trade with the West Indies increased 9,455 tons.

The sales to other countries remained unchanged.

CUMBERLAND COUNTY.

The total sales of this County amounted to 171,079 tons, against 134,671 tons in 1880. A slight increase was made in the export to Quebec, and the home sales were enlarged. The sales to New Brunswick diminished somewhat. Those to other points remained as usual.

COLLIERIES.

JOGGINS.—At this mine the levels have been extended about 8 chains east and west. Two new balances are being driven. The pillars in the old east and west balances have been removed. The output of the mine has been 18,830 tons, against 13,350 tons during the previous year.

MINUDIE.—The Minudie Coal Mining Company have made preparations for re-opening their mine with a view to regular work during next year.

SCOTIA.—A few tons were extracted for land sale. A new slope is to be sunk to the westward of the present one.

CHIGNECTO.—This mine was transferred by the Cumberland Coal Mining Company to Messrs. McInnes and Gillespie in the spring, and since

that date every exertion has been made to establish a colliery capable of a large output. The operations to the rise of the old level have been continued. A new slope has been started close to the mouth of the level, and driven to the full pitch of the seam; it is now 600 feet long, and the winning levels have been turned away for the first lift.

The engine used for drawing coal is one formerly employed for the same purpose at the Nova Scotia Colliery, Pictou Co., and has been thoroughly overhauled. The necessary bankhead, blacksmith's shop, boiler house, etc., have been erected. A manager's house has been built, and several workmens' houses. The water now met in sinking is raised by a special steam pump. It is proposed to slightly change the course of the tramway, and to replace the present rails by others strong enough to allow the passage of the ordinary broad gauge locomotives and cars. It is understood that the greater part of this coal, which is said to furnish an excellent coke, will be used at the works of the Steel Company of Canada, at Londonderry.

SPRINGHILL.—In the spring a borehole was put down to a depth of about 600 feet, to the southeast of the east slope, and yielded a small supply of good water. In the fall another borehole was started about 2,000 feet south of the west slopes, and a large reservoir dug for holding a supply for the boilers during the dryer part of the summer. A tunnel has been started from the north seam to strike the overlying Thirteen feet seam, and is now nearly at the seam. A very heavy feeder of water was met, which gradually drained away. It is proposed to make a new winning on this seam by a pair of slopes to be driven down a short distance north of the west slopes. The large pump purchased from the Albertine Colliery will be placed in one of the present slopes to drain all the seams and to replace the special pumps now in use.

A new furnace has been built near the face of the workings in the North seam, and has the following dimensions: Height of grate above floor, 2 feet 2 inches; diameter of arch, 8 feet 6 inches; length, 36 feet; height of heated column, 100 feet. The levels have been continued into the area of the Mining Association, and new balances driven. The pillars on the west side of the slope have been brought back far enough to leave a barrier for the tunnel etc.

In the south seam the levels from the east tunnel, and the extraction of pillars near the west slope, have been continued. The slope driven from the lower level has been successfully holed into the west slope, and will be utilized for hoisting. About 120 tons of steel rails have been laid on the railway, a new circular screen built, and other surface improvements effected.

STYLES.—During the summer the beds on this property were traced to the west line and found to maintain a regular course. A slope was driven in on the main seam, and about 150 chaldrons of coal taken out. The explorations have proved a large amount of coal on the property, and it is to be hoped that its proximity to the Intercolonial Railway will lead to systematic mining at an early date.

The following section of the Styles and accompanying seams is from the explorations of the past summer.

	ft.in.
Coal seam.....	2.0
Strata.....	12.0
Coal seam.....	3.6
Strata.....	18.0
Styles seam.....	6.0
Strata.....	30.0
Coal seam.....	3.6
Strata.....	8.0
Coal seam.....	1.10

It is considered by those engaged in the explorations that the bands between the upper seams will thin out to the dip.

It is proposed to reopen the River Hibert Mine. Explorations were made during the summer on the Black areas by Mr. Jas. S. Hickman.

PICTOU COUNTY.

The total sales of this County during the year were 346,968 tons comprising 257,573 tons of round coal, and 89,395 tons of slack coal. The usual amounts of coke were made.

ACADIA.—During the past year the levels in the fifth lift have been driven to the boundaries, and the balances driven. Work has been commenced at the inside balances on both sides of the pit. The extraction of the pillars in the upper lift has been completed. A strong barrier has been left to protect the slopes, and the pillar between the railway and mine bords has been left to preserve the latter as a return from the new lift. The gauge of the pit railways has been changed from 4 feet to 2 feet 4 inches.

The Muesseler lamps, referred to in my last report, have been found very satisfactory, and I understand that they will ultimately be the only ones used at the Mine.

During the summer, a Guibal fan, 24 feet in diameter and 8 feet wide, was erected, with the necessary engines, boilers, drift, etc. The casing of the fan is of iron, a material which would appear to be well adapted for this purpose in our climate.

ALBION MINES.—During the past year the water in the main seam workings has been kept below the middle pump set. The deep seam remains closed.

In the spring, two slopes were started on the Third seam, of the following dimensions; width at top 9 feet, at bottom 10 feet, height 10 feet. The slopes are separated by a solid pillar of coal 30 feet thick, and are provided with a distinct system of ventilation, each slope having a furnace 7 feet wide, the base of the crown being 3 feet above the bars, and the length of upcast being 112 feet. The coal is raised by two pairs of 12 inch cylinder engines placed on the bank-

head framing, supplied by steam from a large portable tubular boiler, having 32 three inch tubes. The slopes have been extended for two lifts, and a colliery has seldom been won out in so short a time.

The Third seam presents the following section :

	ft. in.
Good Coal.....	7.9
Slatey band mixed with Coal.....	0.9
Good Coal.....	3.0
Total.....	11.6

Two shafts have also been sunk a short distance west of the slopes, to the McGregor seam, and the narrow work is already well advanced. The shafts are respectively 151 and 136 feet deep, and 12 feet by 9 feet 6 inches, and 9 feet square. The latter will be used as a furnace shaft. The engine is an upright cylinder, made on the colliery, and hoisting with a flat wire rope. The engine house is of brick, and all the fittings at bank are of a substantial character. No pumps have yet been put in either of the mines as the workings are very dry. The following is the section of the McGregor seam :

		ft. in.
Upper Bench.	{ Coal, good	3.3
	{ Slateband	0.1
	{ Coal, good	3.6
Lower Bench.	{ Coal.....	3.2
	{ Coal, good	2.0
	{ Slate, band.....	0.8
	{ Coal, good	1.6
Total.....		14.2

The Back Mine's railway has been extended from a point near the Dalhousie pits, midway between the two winnings, and the screens of both are served from the same empty road. It is stated that the quality of the coals is similar to that mined from the main seam.

INTERCOLONIAL.—The levels in the new lift have been driven to the boundary on the north side, and in their extension to the east the coal was found to flatten considerably. The total length of the slopes is now 2,200 feet. In the bottom lift the dimensions of the pillars has been increased, and the size of the crosscuts diminished to meet the pressure. The extraction of pillars has been continued during the summer. The workings to the east of the dyke have been continued satisfactorily, and the returns in this part of the workings have been retimbered, etc.

Mr. Simpson has adopted the plan of watering his main south level. This materially relieves the horses, etc., and would furnish a certain amount of safeguard in the event of fire (see remarks on report of Royal Commission.)

In the No. 4 slope some twelve places were started during the summer, and worked continuously. Preparations have been made to sink a new shaft to the second seam, at a point a few yards north of the

office, so that the present yard can be utilized. The seam, it is expected, will be reached at a depth of about 150 feet, and a considerable extent of rise coal will be available, beside that which can be reached by inclines from the pit bottom.

The produce was 135,084 tons against 81,254 tons in 1880.

VALE COLLIERY.—During the past year narrow and pillar work was successfully carried on in the lower lift. In the pillar coal lamps were used with shot firers. A heavy feeder of gas was met during the summer coming from the roof and caused, it is believed, by the measures breaking up to an overlying seam. The work of sinking for a fresh lift of coal has been commenced. The capacity of the pump has been enlarged. The new Guibal fan has been erected and is now ready for the boilers, the building of which appears to have been delayed. The fan is 30 feet in diameter and 10 feet wide, and similar in design to the one erected some years ago at the Albion Mines. Upon the completion of this fan all the mines in the Pictou districts, except those opened this year, will have been furnished with this indispensable requisite for a systematic and safe method of maintaining ventilating currents. New winding engines have been procured, and it is understood that they will be erected to haul from the new lift.

The production was 90,215 tons against 86,522 tons in the previous year.

CAPE BRETON COUNTY.

The sales of coal from this County amounted to 516,852 tons against 380,848 tons in the preceding year.

The Home sales were 136,922 tons against 110,578 tons in 1880, an increase of 26,344 tons. The sales to Quebec amounted to 149,643 tons, an increase of 85,711 tons.

There was a slight increase in the sales to New Brunswick.

The sales to Newfoundland were 60,943 tons, against 68,132 tons in 1880.

The sales to Prince Edward Island show an increase of 8,617 tons; those to the West Indies increased 8,774 tons.

The sales to the United States were 93,119 tons, against 83,032 tons in 1880, an increase of 10,087 tons.

COLLIERIES.

SYDNEY.—During the past year the extension of the workings in accordance with the original plan has been continued. The face of the south side levels are now 60 chains from the pit bottom, and the bords are now being continued beyond the face of the Queen pit bords, an interval of 400 feet being left. The operations in the dips have been continued. It is proposed to connect the Queen pit drawing shaft with the fan drift, to give a larger upcast. It is also proposed to raise the

Queen pit water by means of a force pump. Four coke ovens have been built to supply fuel to the locomotives, etc. These mines raised 161,477 tons against a production of 143,254 tons, in 1880.

LINGAN.—During the past year dips were pumped out to give a lift of 350 feet, and levels turned to the south for thirty working places. The south levels in the upper lift have been stopped at the land barrier, and some of the pillars have been split. No work has been done on the north side this year, but should the state of trade warrant, openings could be readily made. The returns show a slight increase in the quantity of coal mined.

RESERVE.—The north slope was extended to within 20 yards of the boundary, and levels turned away to the north. The south slope has been continued 260 chains, and levels turned north and south. Pillars were taken out on Nos. 3 and 4 levels on the north slope. The workmen's houses have been repaired and other work necessary for the maintenance of the Colliery has been carried out. The produce of the Mine was 76,727 tons against 37,621 tons, in 1880.

INTERNATIONAL.—The workings have been extended on both sides of the dip slants, and to the rise from the south side levels. The slants have been extended to form a lodgement. On the surface the screens have been reversed to admit of more ready handling. A new carpenters' shop and weigh scale has been erected. The furnace has been improved by having a good air space provided at its sides and above.

LITTLE GLACE BAY.—During 1881 the north side levels and headways were advanced a short distance and three bords driven in the south side dip, and the working places of the previous year were continued. The returns show an out-put of 35,012 tons as compared with 24,371 tons in the previous year.

CALEDONIA.—During the past year the operations at this Mine have been confined principally to the pillars. The adit from the lake has been continued to the upcast, and some of the crop coal won by bords. The large pillars to the rise of the drawing shaft have been split. On the north side of the pit some of the larger pillars have been robbed by taking slices off their side, others have been split and drawn. The out-put of this Mine was 43,426 tons, against 18,589 tons in the year 1880.

ONTARIO.—The north side levels have been re-opened and bords turned away; the south levels have been continued, and room made for fourteen working places. A number five Cameron pump, with 3 inch column, has been put in, and can keep the works dry with three hours pumping per diem. Two new boilers have been put up, and the trestle work leading to the shipping shoots has been repaired. The system of carrying the coal to the wharf in large wagons has been abandoned, and the pit tubs are discharged directly into the vessels.

The ventilation has been assisted by adding 30 feet to the upcast, and preparations are being made to build a small furnace.

This year 15,117 tons were raised against 8,695 tons in the previous year.

BLOCK HOUSE.—The extraction of pillars has been successfully continued. The water brought into the pit by the falls having proved troublesome, it is proposed to put in a new pump. The produce was 61,108 tons against 48,475 tons in 1880.

GOWRIE.—The levels have been continued in the upper lift, and bords driven to the rise and the pillars brought back as usual. It is understood that this winter the slides, etc., will be put in the new shaft.

The returns show a production of 64,180 tons against 46,990 tons in 1880.

Little work was done at Broad Cove and Campbellton beyond keeping the mines open. At Little River the main shaft at the old colliery has been pumped out, and it is proposed, if the quality of the coal should prove good, to commence regular operations. Explorations have been carried on near Point Aconi, north of the submarine area of the General Mining Association, with a view to winning the seaward extension of the seams. A discovery of anthracite coal is reported from Adams' Lake, East Bay, Cape Breton County, but no details are yet known as to the value of the deposit.

GOLD MINING.

GENERAL REMARKS.

The total yield of gold during the past year was 10,756 oz. 13 dwt. 2 grs., against 13,234 oz. in 1880. The returns from unproclaimed districts amount to 2,436 oz. 9 dwts. 12 grs., an increase of 1,594 oz. 4 dwts. 23 grs. over the preceding year. The continued decline in the produce of several districts which have hitherto yielded uniform returns, has outweighed the increased production of several districts.

During the past year the extraction of quartz was more or less suspended in the following Mines, which were sold and being prepared for work on a more extensive scale, viz: Moose River, Satemo, Gallagher and Renfrew. A large number of other mines which have hitherto contributed to the returns, have been idle during part of the year, pending negotiations for their sale; among these may be mentioned, Strawberry Hill, Fifteen Mile Stream, Harrigan's Cove, Moosehead, Symonds, and several Mines at Oldham and Mount Uniacke.

That the interest in the Mines has not diminished is shown by the fact that in spite of the suspension of work alluded to above, the returns, not including a large amount of prospecting done at Chezzetcook, Beaver Dam, and other places, show a much larger number of days' work than in the previous year. Under these circumstances the outlook for the year 1882 is of a favourable character, as in it should be reaped the fruits of the large amount of preliminary work performed during the past year.

DISTRICTS.

CARRIBOU.—During the past year little work was done at Carribou except on the Lowell property, on areas 373 and 374, and by R. G. McDonald & Company, who worked on area 350.

At Moose River the Foster property and mill, and later on the Cole areas, were purchased and are being put in shape for systematic work. Openings have been made on the Comstock, Sutherland and other lodes.

Mr. D. Archibald worked the Walton lode successfully during the summer, and Mr. Cole continued his operations. Mr. Touquoy also worked on area 131, and at other points. The total yield was 1,129 oz. 18 dwt. 13 grs., against 823 oz. 5 dwt. 19 grs., in 1880.

FIFTEEN MILE STREAM.—Operations in this district have been principally confined to the property of the Messrs. Hall, who continued

their work on the lodes mentioned in my last report. Two new lodes were found twenty feet north of the Orion belt, 20 and 6 inches in thickness. Prospecting was done by Messrs. Grant, Walton, McDonald and others.

LAWRENCETOWN.—No work of any consequence has been done here last year.

GAY'S RIVER.—A return of 12 ounces was made in the spring, and no work has been performed since.

MONTAGU.—Work has been continued on the Rose lode. The fault which passed so much water into the works was a nearly flat-lying throw, dipping south, and shifting the load about three feet south. The new pumps were set to work, and the mine was drained in the early part of the year. The main shaft is now 280 feet deep. Operations have also been continued to the eastward, and pay quartz extracted.

On the Symonds' property work has been continued along the line of lode opened by them. Operations were stopped for some time during the summer to put the mill in complete repair.

Messrs. McDonald and Stutter prospected some areas lying south of the Rose area, and a 7 inch lode carrying gold was stated to have been found. Some work was done by Mr. Sutherland on his properties, and resulted in the finding of a lode 8 to 10 inches thick, part of which carried gold. Prospecting has also been successfully carried on by Mr. Foster, two lots from lease 105 of 29 tons yielding 20 oz. 7 dwts. During the fall a mill was put up a few yards east of the Symonds property by Theodore B. Hale, Esq., for the purpose of concentrating the tailings of the district. The process consists of drying the tailings at a low heat on iron plates, and by means of steam pipes; they are then sorted into two sizes and passed through automatic jigs, air being used instead of water. The resulting pyrites, free gold, etc., are forwarded to the United States for treatment. According to the returns there are about 9,000 tons of tailings resulting from mill work in this district.

WAVERLEY.—Work was continued during the year on the lode found and tested on the McClure property last fall. A little work was done by O'Toole and others, the total yield being 374 ounces from 535 tons of quartz.

A mill for the retreatment of tailings and the extraction of the gold from the sulphurets, etc., has been started here, but has yet not got fully into operation.

OLDHAM.—Comparatively little work has been done here this year. Prospecting was done on some new lodes by Mr. Baker after he ceased work in his large lode. The Messrs. Donaldson have opened a set of lodes a short distance south of the Mayflower mill, which promise to be valuable, and a good deal of preliminary work has been done.

RENFREW.—Operations here have been confined principally to the works carried on by Dr. Rae. He has opened the Brook, No. 2, and

Bain leads by shafts and levels, exposing good blocks of ore. It is expected that the commencement of regular mining will show steady returns, corresponding to the systematic manner in which the leads have been opened out

SHERBROOKE.—The returns from this district still show a great falling off. They amount to 5,277 tons of quartz, giving 2,580 oz. 2 dwts 20 grns., against 6465 tons, yielding 4,042 oz. 7 dwts. 9 grns. in 1880, and 9209 tons, yielding 7,389 oz, 17 dwts. 15 grains in 1879.

Operations have been continued on the Wellington property. The operations from the west shaft have been continued to the west. The proprietors propose to follow the pay quartz by means of an incline from the bottom of the present shaft, in order to avoid, as far as possible, the dead work now required. They propose re-opening the Wellington lead this winter. The consumption of coals by the engines has been materially reduced by an ingenious method of heating the feed water.

A wide belt carrying much quartz was opened on the Palmerston property, the work included the former workings of the company. Mr. Fraser proposes to build a tramway to his mill, and to thoroughly test the problem of treating low grade ores. A little to the north on the turn of the measures about 200 tons of quartz were taken out by an open cut by Mr. Anderson and others.

Work was also done by Mr. John Williams on the Gladstone. Messrs. Hattie and MacNab continued their operations on small but promising lodes in the eastern part of the district.

Work was continued at Cochran's Hill by Mr. Cumming. From the official returns it appears that the yield from 659 tons of quartz was 252 oz 18 dwts., an average of 70 dwts. 16 grns., the highest being at the rate of $2\frac{3}{4}$ ounces to the ton. These lodes are characterized by large quantities of iron and arsenical pyrites, carrying considerable quantities of gold and silver, and the district is favorably situated for extracting and treating this class of ore. The attention of our miners is being turned to these ores, which merit much greater attention than has hitherto been accorded to them.

STORMONT.—The Gallagher property was transferred to the Gallagher Gold Mining Company, of Boston, who have commenced extensive works. The necessary buildings, stores, etc., have been erected, and a 10 stamp mill set up which it is expected will be started at once.

TANGIER.—Little work was done on Strawberry Hill during the summer. In the fall a prospecting shaft proved a belt of leads showing gold to the north of these hitherto worked. It is intended to further test them by an adit. The Forrest lead on Butler's Hill, and the McDonald lead near the dyke, are being prospected.

From a summary of the work done on the Forrest, Dunbrack and Wallace lodes on this property since March, 1867, it appears that 5,041 tons of quartz have been crushed, yielding 4,897 oz. 17 dwts. 19 grs., an average of $19\frac{1}{2}$ dwts. to the ton.

The Satemo Gold Company, who purchased the Barton Washington property have made extensive openings in the Nugget and

Kent lodes. A large amount of quartz has been extracted pending the completion of their 10 stamp mill. This mill, erected by Messrs. Beckett and McDowell, presents some features new to this Province.

The Pittsburg Company have continued their operations in the Field and adjoining lodes; some lots of quartz were crushed from the property of the Company at Ecum Secum. Prospecting was carried on to the west of their property, and some leads found, which were stated to show gold.

At Mooseland a level was driven by Mr. Crossland to cut the large lodes north of the Irvine lode, and other work was performed.

UNIACKE.—Work has been continued steadily during the year. Mr. Blois continued working the nugget lode, his main shaft is now 200 feet deep. A little work was done on a small lode lying a few feet north.

On the Uniacke property Mr. Prince continued working the slate belt, lying west of the mill.

Messrs. Bayne and others did some work on the Westlake property. Mr. Foster, on the Prince of Wales area, reopened the Bunker lode, and another lode lying north of the main road. He put up a light 5 stamp battery driven by steam, which was worked at intervals during the summer. Work was also done on the eastern extension of the Nugget lode by Messrs. Davidson, Herbin, and others.

WINE HARBOR.—The work in this district has been confined to the Henry mine, which has been continuously and successfully worked. The crushing was done at the old water mill at the head of the harbor, which was refitted. The pay streak was found to dip east, at the rate of one in ten, and some of it ran ten ounces to the ton.

OTHER DISTRICTS.—The activity of the previous year has been maintained during the period under review, and the valuable character of some of the discoveries confirmed.

At Ecum Secum the Pittsburg Company sank a shaft in a 20 inch lode, and prospected a thick lead lying about 1000 feet south of the former one.

At Shier's Point, little work was done during the summer, as was also the case at Harrigan's Cove.

The Salmon River Mines have been steadily worked; the lode, so far as opened, varies from 4 to 6 feet in thickness. A water mill of 20 stamps has been built, and a boarding house to accomodate 60 men, beside other buildings required for mining operations.

The work at the Yarmouth Gold Mine has been discontinued.

A test was made in Boston of a few tons of quartz from Middlefield, Queens County, which yielded at the rate of $19\frac{1}{2}$ dwts. to the ton; however, the work was not continued.

A little work was also done on Tancook Island, Chester Basin, Gold River and Indian Path.

Gold was reported to have been found at Black Brook, 12 miles south of Glengarry, Pictou Co., Lake George and Kempville, Yarmouth Co., Musquodoboit Road, Sheet Harbor, etc.

In my last report reference was made to the discovery of auriferous lodes at Chezzetcook. During the past summer prospecting has

disclosed a large number of veins, showing gold, and so far as can be judged from the work done the district promises to become valuable.

In Mr. J. H. Anderson's property seven lodes from 5 to 18 inches in width were found to carry gold. Similar veins have been proved on the property held by Dr. Cogswell and others. On the McLeod property a belt of promising lodes has been cut, and a four foot lode carrying gold. It is intended by the chief operators to put up a mill during the winter, to further test the capabilities of the district. Few of our mining districts are more favourably situated, as vessels can lie within a mile of the mines.

COPPER.

During the past year operations in the ores of this metal present few new points of interest.

Discoveries were reported from Hopewell, Pictou County, Spring Hill, and Margaretsville, Annapolis County.

At the Coxheath property, near Sydney, one shaft has been sunk 60 feet, and about 50 feet of levels driven east and west, showing yellow and purple ores in paying quantities. A second shaft has been started, 700 feet to the west, and is now 25 feet deep. A number of trenches have been dug exposing the lode at various points. The necessary shaft, boarding and other houses have been built. Employment has been given to about 50 men. Should the present encouraging show of ore continue, it will doubtless prove a valuable mine, and mark the commencement of a new mining industry in the Province.

SILVER, LEAD, ETC.

During the past fall a little more prospecting has been done in the Higgins' silver ores. At Smithfield, Colchester County, openings were made on deposits of galena said to carry remunerative percentages of silver.

Other localities where silver lead ores have been reported from are St. Ann's, Cape Breton, Arichat, East River of Pictou, Nine Mile River, Hants Co., and Salmon River, Cape Breton County. At the last named locality the ore appears filling the beds lying at the junction of the carboniferous with older strata. A large sample has been taken out and sent to the United States for a test, but I have not learned what the results were.

IRON MINING.

Operations have been continued at the mines of the Steel Company of Canada, and present no new features of interest. The amount of ore mined was 39,588 tons, and 975 tons of ankerite were quarried for flux.

Discoveries of Specular ore were reported from Battery Hill, Pictou Co., and from the West River of St. Mary's. At Boyleston, Guysboro' County, Messrs. D. M. Fraser and A. Cummingier have opened a series of veins of specular ore, of unusually good quality, varying in width from two to four and a half feet. About 255 tons have been sent to Londonderry. The mine is favourably situated for shipping, and the quality of the ore is such as should command a market in the United States. About 12 miles west of Guysboro', at Erinsville, a similar deposit, said to be 15 feet wide, has been sold to the Crane Iron Co. of Philadelphia, who are making preparations for developing it.

A fine quality of red hematite has been found at River Philip, but no search has yet been made for the ore in situ.

In Cape Breton, further work has been done in the Moseley red hematite at East Bay and the bed, by my own measurements, was found to have increased in thickness to 13 feet in the eastern openings. The proprietors purpose taking out a few hundred tons for a trial cargo.

A deposit of red hematite was partially tested at Loch Lomond by Mr. Mosley. The following analyses shows these ores to be of high grade:—

	EAST BAY.		LOCH LOMOND.
	Steel Co. of Canada.	Geo. Sur.	Geo. Sur.
Peroxide of Iron.....	82.75	85.037	83.645
Protoxide of Iron.....	....	....	7.640
Phosphorus .....	.070	.014	.033
Sulphur	trace.	.075	.078
Manganese oxide.....	.26	....	.285
Moisture	1.30	....	.341
Alumina	1.55	....	....
Lime.....	1.20	....	....
Magnesia .....	.66	....	....
Insoluble residue.....	12.80	....	7.768
<hr/>			
Metallic iron	57.92	59.526	64.494

These deposits are favourably situated for mining, and at short distances from shipping places. From their analyses they should be

adapted for Bessemer use, and will ultimately furnish very valuable supplies of ore to local furnaces.

The bed of red hematite found at Smith Brook, has been further prospected and found to have a width of 20 feet.

A bed of red hematite 15 feet wide has been found within two miles of the Pictou coalfield. Analyses have shown it to yield 44.50 per cent. of metallic iron with small amounts of sulphur and phosphorus. The quality of the ore is well adapted for smelting, and it is to be hoped that an effort will be made to utilise it for this purpose. As it is much nearer shipping and fuel than any deposit hitherto found in that district good grounds appear for the success of such an enterprise.

MANGANESE.

During the past year operations have been continued at the Tenny Cape Mines by J. W. Stephens, Esq., who also opened a new mine at Cheverie, yielding a very fine quality of ore.

On the North River of Truro Messrs. McLellan and Archibald prospected for the source of the rich boulders found there. Some veins have been found, but regular work has not yet been commenced. About 15 tons of very good ore were obtained, part of which has been shipped.

Prospecting was also done at Pembroke. The Hon. E. T. Mosely has proved that Cape Breton is to be added to the list of Manganese producing districts. During the past year he has opened a mine in the farm of Murdoch McCuish, and another on the property of Norman Morrison, Glenmore, Loch Lomond. About 70 tons have been shipped, principally to the United States. The ore is described as suitable for glass, chlorine, and ferro manganese. The following analyses will show its quality, and were made in the laboratory of the Geological Survey, by Mr. C. Hoffman :

No 1.	After drying at 100 C.	peroxide of Manganese.	..81.52 per cent.
No. 2.	"	"	" ..88.98 per cent.
"	"	"	" .. .21 per cent.
		Iron	.. .21 per cent.

All the samples analysed are returned as very free from iron.

During the past year the prices of Manganese have risen very much, owing I believe to the exhaustion of the continental deposits yielding the higher grades of ore. The importance of this increase in value may be learned from the fact that first class ore from Nova Scotia has been sold in Boston for \$120 per ton. In this Province it is found associated with limestones of lower carboniferous age, and there can be little doubt that it exists in large quantities, as specimens are found at every point where these measures occur. Should the present demand continue there is no doubt that in a few years it will form an important part in our list of mineral exports.

FIRECLAY.—The extraction of fire clay has been continued by Messrs. McIntosh & DeWar, of Stellarton.

PETROLEUM.—The borings spoken of in my last report have been continued during the season, but the results have not been made public.

ACCIDENTS.

During the year 1881 the following fatal accidents occurred :

1. January 20.—John Blue, deputy, Springhill—stepped on wrong road while working on back balance, and killed by cage.
2. March 29.—Robert Cook, trapper, Sydney Mines—riding on engine plane.
3. April 9.—John Nash, collier, Acadia Colliery—barring off coal from pillar.
4. October 6.—Robert Bigney, cage runner, Springhill—killed by breaking of rope on cage.
5. Nov. 23.—John Nicholson, collier, Vale Colliery—caught by door in slope, while riding on rake.
6. Dec. 16.—Nobel Farnen, driver, Londonderry Iron Mines—killed by box running away on incline.

Among the non-fatal accidents, four were caused by ignition of gun-powder. Two of these happened at the Albion Mines. In one case the fuse of the charge had gone out, the miner returned and relighted it, but it ignited the charge almost immediately. The other injured two men, and was caused by the explosion of a can of powder in the hands of a man who was charging a hole with his lamp in his cap. The explosion was caused by a spark from the lamp, and the escape of the men from instant death was providential.

Another, reported from the Sydney Mines, was stated to have occurred during the use of a copper needle by a man taking down stone.

A man was burned at the Vale Colliery while measuring out powder with his lamp in his cap.

The same man and his partner, a few weeks after, were burned by the ignition of powder in a hole he was charging, it is supposed from the tamping bar.

A man was injured at the Joggins Mines by signalling away the cage before the tub was properly secured.

Two shiftmen were slightly burned at the Vale Colliery by gas from a fall of stone in the returns. This occurred a few hours before the heavy feeder already referred to.

REPORT OF ROYAL COMMISSION.

The preliminary report of the Royal Commission on Mining Accidents contains much useful information, and should be read by all who are interested in coal mining. The following summary of the results of their work will prove interesting.

Many differing opinions were expressed by witnesses on the subject of laying out the workings of collieries. A great majority of opinions are in favour of working out an upper seam before taking out the one immediately underlying it, but that with regard to safety it is not a matter of much moment, unless the interval between the seams be very small. The actual mode of working in England, though somewhat modified locally, may be broadly divided into bord and pillar, long wall, and the Yorkshire and South Wales system of "banks," where the roof is allowed to fall within rooms of comparatively limited extent.

Strong evidence was given in favour of the safety of well planned longwall workings, both as regards facility of ventilation and lessened liability to accidents from falls. It was admitted that under certain circumstances seams cannot be advantageously worked on this system, and the Scottish teaching is that its benefits are limited to seams not exceeding 5 feet in thickness. This, however, is at variance with some English and Welsh examples. Some observers state that in their opinion a rapid working of longwall causes a large efflux of gas, others again believe that no serious danger is to be apprehended from this source, and many of the most experienced managers lay great stress on the superior safety of a rapid advancement of the longwall faces.

The Commission report that great progress has been made in ventilation during the last fifty years, and the proposed introduction of the steam jet in 1851, and the rapid extension of mechanical ventilation since 1862, have led to experimental and practical improvements which have resulted in the employment of volumes of air far in excess of the quantities once deemed sufficient.

Well planned and isolated furnaces in deep pits are found to give the most powerful currents. Thus, at South Hetton and Murton 380,000 and 440,000 cubic feet are obtained from three furnaces and twelve boiler fires. At the deep pit, Rosebridge, 235,000 cubic feet of air per minute are circulated by two 9-foot furnaces. It must be remembered that such furnaces should be continuously fed, and that no gas be allowed to pass over the fires. To meet this latter requisite the introduction of furnace air drips has become customary.

Many managers of collieries having deep, dry shafts prefer this method of maintaining the air currents, but the evidence of numerous witnesses shows that the volumes of air circulated by mechanical ventilators, varying with the dimensions and speeds of the machines, equal those of the largest furnaces in ordinary practice, and form a strong argument for the still more extensive use of these powerful and easily regulated air motors.

The falls of roof and sides cause a large proportion of fatal accidents, and it must be remembered that this is one of the most difficult

class of accidents to guard against, for besides the propping, walling, and packing, the nature of the roof, of the coal itself, the quality of the floor, the system of working, the method of cutting, all present difficulties and require special attention to be devoted to the effects they produce on the stability of the material surrounding the miner.

In the longwall system of working, the use of pillars of crossed timber or stone, "chocks," has become general, and more attention has been paid to pack walls. The introduction of cast iron props did not prove permanent. In Durham and Northumberland, where accidents under this head are comparatively few, the setting of the timber at the faces of the coal, and the drawing of it when done, are entrusted to special officials, and the miners are required merely to secure their working places temporarily. On the other hand the general system in England, Wales, and Scotland, is to make the colliers secure their own working places, both employers and workmen asserting that the nature of the roof and other circumstances will not permit of the Durham system being adopted.

The issue of gas from coal seams is one causing many serious accidents, and one upon which accurate information is much needed, there being no definite knowledge as to the condition in which the gas exists in the coal. If gas be regularly emitted from fresh faces of coal it may be dealt with by vigorous and well directed ventilation. The accumulations caused by lack of ventilation, or its interruption by partial openness of goafs, falls of roof, etc., are referred to throughout the evidence as sources of accident to be guarded against only by care and unceasing vigilance. The evidence on the subject of sudden outbursts of gas, which have become alarmingly frequent of late years in English and Belgian pits, as their depth increases, is highly important. The immense volumes of gas thus unexpectedly poured into the workings have again and again overpowered for a time the strongest ventilating apparatus in use. There appears to be good ground for concluding that the daily examinations of the working places are properly carried out by the colliery officials, although in some cases the opinion was expressed that too long an interval was allowed between the time of inspection and the entry of the men. Many of the experts preferred the Davy lamp for gas testing, but the Ansell indicator was pronounced useless.

The evidence shows that the variations of the atmospheric pressure exercise an undoubted effect on *accumulations* of gas in mines. Few observers believe in any important influence of atmospheric pressure on the issue of gas from solid coal, stating that the amount of gas thus evolved produced no effect on the air currents. At many collieries, when the barometer is falling and when the wind is southerly extra precautions are taken by increasing the speed of the fan or the supply of coal to the furnace, though few of the witnesses believe that there is any close relation between the atmospheric pressure and the occurrence of colliery explosions, especially among some of the viewers from the north of England who have closely watched these phenomena and are of opinion that such connection has not been made out.

On the influence of coal dust on colliery explosions, much important information was elicited.

Mention appears to have first been made by Faraday and Lyell in

1845 of the influence coal dust in mines might exert on the magnitude and extension of explosions of fire damp. Some experiments were made by M. Verpilleux in 1867, and he came to the conclusion that it played an important part in colliery explosions.

The subject was more fully examined into by M. Vital in 1875 in connection with an enquiry into the cause of an explosion in a part of the Champagnac Colliery, where no fire damp had ever been detected.

Shortly after Mr. W. Galloway began a series of valuable experiments on the influence of coal dust in colliery explosions, and laid the results before the Royal Society in two papers in 1876 and 1879. Mr. Galloway in the first paper arrived at the conclusion that a mixture of air and of a certain coal dust which had been subjected to chemical and practical experiment was not inflammable at the ordinary pressure and temperature of the air, but, that the presence of a very small proportion of fire damp, too small to be detected by a Davy lamp, made the dust inflammable and caused it to burn freely with a red smoking flame. From this it was deduced that an explosion originating in any way in a dry and dusty mine may extend to remote parts of the workings where the presence of fire damp was unsuspected.

In the second paper it was shown that the return air of a mine emitting gas, as in the Llwynypia Colliery (where the return was estimated to contain approximately 2 to $2\frac{1}{2}$ per cent. of fire damp) may be rendered inflammable by the addition of coal dust. Experiments were also detailed by which it appeared to be demonstrated that the flame of an explosion of fire damp might be extended for some distance even in the absence of fire damp by means of the dust raised and suspended in the galleries by the concussion of the air.

A valuable contribution to the literature of the subject has been made by Professor Abel in his report on the Seaham explosion. The following are the conclusions he arrives at:—

“That coal-dust in mines not only promotes and extends explosions in mines, by means of the rapid inflammability of the finely divided combustible, and of the readiness with which it becomes and remains suspended in air currents, but that it may also be itself readily brought into operation as a fiercely-burning agent which will carry flame rapidly as far as its mixture with air extends, and will operate even as an exploding agent, through the medium of a proportion of fire-damp in the air of the mine, the existence of which, in the absence of the dust, would not be attended by any danger. Although the explosion which may occur through the agency of a non-combustible powder in the manner described, may be of very mild or feeble character in the first instance, it may be almost at once increased in magnitude and violence by coal-dust which the first ignition will raise and bring into action. The proportion of fire-damp required to bring dust in a mine into operation as a rapidly burning or an exploding agent, even upon a small scale, and with the application of a small source of heat or flame, is below the smallest amount which can be detected in the air of a mine, even by the most experienced observer, with the means at present in use, as has been already demonstrated by the experiments of Mr. Galloway. In the complete absence of fire-damp, coal-dust exhibits some tendency to become inflamed when passing a very large lamp flame at a high velocity; if exposed to the action of a large volume of flame, such as produced by the explosion of freely-exposed gunpowder or gun-cotton, it exhibits, in addition, a decided tendency to carry

or propagate flame. But it can scarcely be maintained that the air of a mine in which the coal gives off gas at all can be at any time free from fire-damp ; and as the existence of very small and unsuspected quantities of that gas in the air of a mine may suffice to bring about the ready propagation of flame by coal-dust, and thus to develop violent explosive effects, it would appear needless to assume that coal-dust may, in the entire absence of fire-damp, give rise to explosions, even of only limited character in coal mines, in order to account for casualties which cannot be ascribed to the existence of accumulations or sudden outbursts of fire-damp."

It has also been found by the Professor that finely powdered slate assisted materially in "extending" the range of fire-damp explosions.

An extension of these experiments has shown that in air, travelling at a velocity of 600 feet per minute, different coal dusts, suspended in the air, containing from 2 to 2.75 per cent. of fire-damp, caused explosions. At a velocity of 100 feet per minute, the same results were obtained with air containing only 1.5 per cent. of gas, and ignitions of dust extending to considerable distances were observed in "air" containing much smaller proportions of gas.

Mixtures of fire-damp and air approaching explosive proportions were instantaneously ignited by a lamp when they contained only a few particles of dust in suspension, and it was also found that the dust of substances not inflammable was capable of producing these effects.

The evidence on the subject of removing or watering the dust of dry mines was not conclusive. In some Welsh mines the watering of the working places has proved beneficial, but there are many practical objections, among which may be mentioned the tendency of the bottom to swell when wet.

Some few experienced managers expressed an opinion that every mine might be sufficiently ventilated to allow of open lights. Some good authorities unite in saying open lights lessen the danger from falls, that the men are better educated to be cautious, and that ventilation is sure to be better attended to. The preponderance of the evidence however seems to be in favour of the use of safety lamps when anything approaching dangerous amounts of gas begin to be given off, and it is not to be denied that their employment becomes necessary in mines liable to sudden outbursts, or where an interruption of ventilation may cause an accumulation of gas.

The Davy lamp is preferred by many, especially for inspection by the firemen. One manager stated that he placed implicit confidence in it, and had long used 5,000 to 6,000 of them daily without being able to trace any accident to them. Others again claim equal merits for the Clanny ; some however were found to admit its imperfections. In Yorkshire, where sudden outbursts of gas are met, the property of going out in gas has secured a preference for the Geordie, but witnesses admitted its dangerous condition when the glass was broken. At a few places the Mueseler lamp has been used for twenty years, and the testimony in its favour is clear and unanimous on the score of safety and economy. The evidence shows that the use of unprotected Clanny and Davy lamps, in an explosive mixture moving at a rate exceeding 6 feet per second, is exceedingly dangerous. The majority of the witnesses declared as a rule it is practically impossible to work

mines without powder. While some would forbid the use of powder when safety lamps are used, many of experience hold that in mines giving off gas it does not follow that in all cases where such lamps are used it is unsafe to blast. Many witnesses consider that restrictions may be desirable, either that the shot firing should be entrusted to officials, or allowed only in certain parts of the work or at night when the men are out of the pit. The final conclusion arrived at by the Commission will be awaited with great interest.

There is one point elicited by the evidence of the Commission which I wish to bring particularly to your notice, and to the consideration of those engaged in conducting the operations of the collieries in this Province giving off more or less gas. From the results of experiments detailed before the commission, it appears that dangerous ignitions of coal-dust readily occur when percentages of gas, undetectable by ordinary tests, are present. In view of this evidence, which I believe has not been contradicted, it will be seen that the use of powder in mines giving off gas even in small quantities, may under the conditions readily occurring in practice, give rise to serious explosions, when to all ordinary observation the mine may previously have appeared to be in good order.

It will therefore appear that the question of the use of gunpowder should be confined by the careful manager within narrower limits than those laid down by the Act. It would be improper to attribute all explosions to the use of gunpowder alone, but it is a significant fact that in the West Riding of Yorkshire, at a number of the largest collieries, the use of powder has been discontinued, and it appears from the last returns that the district, formerly noted for disastrous accidents, recorded but one death from explosion of gas.

ACCUMULATION OF GAS.

The accumulation of gas in working places, either by defective ventilation, or by the discharge of pent-up blowers, has been frequently observed. There is, however, a point in connection with the accumulation of gas in goaves which merits attention. It is known that old workings which were free from gas have been found to hold as much as 30 per cent. of fire-damp which must have been introduced from without. This fact cannot be explained by the law of diffusion of gases, for such gases accumulate in goaves, pot-holes, and, separate from air currents, at the top and along the sides, where they are of varying speed and intensity. It would appear that the Berthollet law, which holds good for gases in equilibrium, and is based upon the attraction of molecules of gases of various composition, does not apply to moving gases, and this idea is supported by some recent researches.

In 1860, Mr. Clerk Maxwell came to the conclusion that all gases consist of innumerable minute particles capable of moving in every direction. Clausius in 1874 arrived at similar conclusions, and enlarged on the effect produced by currents causing lighter or smaller particles to separate from those which were heavier.

In 1879, Mr. Crookes, in his celebrated lecture on "Radiant Matter," showed that by the impact of gas molecules on certain substances phosphorescence was produced; that their impact could produce heat

enough to melt platinum. He showed that they moved in straight lines, behaved like solid bodies, and that all these properties were irrespective of the composition and specific gravity of the gases. From his experiments it will be seen that molecules of comparatively lighter gases will, by the innumerable blows they receive in a current of gases, be constantly pushed aside, while the heavier particles continue their course. From this it follows that motion favours a separation of gases, which is changed to a diffusion by attraction when rest follows. Thus, the in-take air gradually takes up particles of fire-damp and as it passes along continually buffets them to the high side. When, therefore, such currents of air skirt goaves or old workings, there is an opportunity offered for the already partly disassociated gas to enter them and become diffused in a state of comparative rest.

Dr. Gurlt, lecturing on the above subject before the German Institute of Mining Engineers, advocates the use so far as possible of dip ventilation, as best adapted to oppose the light gases and sweep them into the closed levels leading to the upcast. I may mention here the bearing this law has practically on two points, first, the impropriety of having currents of air skirting goaves, and the avoidance of abrupt turns in the currents as at the face of rise drifts, etc., for at these points the disassociation would be greatest, leading to the combustion of more gas in the lamps and the retardation of the current. Other points also arise in which the study of this principle will be found useful as assisting in the solution of the problem of getting the best work possible out of the air currents.

Experiments made by M. DeRossi with the microphone, tend to show that outbursts of fire damp are preceded by slight microseismic undulations and noises appreciable only by the microphone. Should further observations show that the variations of the barometer over large surfaces of the earth and earth movements can be detected by their effect on this instrument it may become an important aid to the operations of coal mining.

PRESSURE OF GAS.

Mr. Lindsay Wood recently communicated to the Newcastle Mining Institute the results of a set of interesting experiments on the pressure of gas in coal seams.

The writer states that having had his attention directed to the frequency with which blowers of gas escaped under pressure from coal workings, he was desirous of ascertaining if the gas existed at a high pressure in the solid coal. Also, of finding out what was the rate of escape, and its duration, so as to afford data for the comparison of the effects produced by working mines by single and double shifts.

To this end five distinct sets of experiments were made, and holes bored to various depths in the coal in the collieries of Elemore, Hetton, Eppleton, Boldon and Harton. These holes were plugged and gauges applied, and the presence of gas at very high pressure was speedily shown.

The depth of the seam at Elemore was 750 feet; at the other collieries from 1,215 to 1,268 feet.

The maximum pressure at Elemore in a fourteen feet hole was 28 lbs. The pressures at the other collieries ran as high as 461 lbs. to the square inch, being equal to 84 per cent. of that due to a column of water the same height as the depth of the seam from the surface. It was much less at some of the other mines, and bore a relation to the length of time the seam had been worked as at Elemore, which had been worked fifty-three years, only $8\frac{3}{4}$ per cent. was recorded.

It also appeared that under similar conditions of cover the pressure varied as the square root of the distance of the end of the bore hole from the face of the coal.

The amount of gas given off per hour, per square foot of coal, as exposed by the bore holes, varied from .243 to 3.889 cubic feet. It is also noteworthy that the results show that there is no connection between the variations of the barometer and the temperature of the air, and the quantities of gas evolved.

It is to be hoped that these valuable experiments will be continued, to afford data on certain points of interest, such as the effect of the water of the strata on the pressure of the gas, the composition of the escaping gas, the deepening of the bore holes to determine if at any distance from the face the gas exists in the liquid form. In my last report, I mentioned some of the arguments which have been brought forward in support of the view taken by some mining authorities in favor of the existence of fire-damp in a consolidated form. Under ordinary circumstances, the resumption of the gaseous form by the gas would not be attended with directly injurious effects, as it would be a gradual process proportioned to the lessening of the pressure by the miner's work. However, should it exist in any portion of a coal seam where pressure was maintained by a section of unusually strong coal, etc., circumstances might readily arise permitting it to exercise explosive force resulting in the breaking away of coal and possible explosions at lamps. The instance is recorded of such an explosion of carbonic acid, confined under great pressure, in a Belgian mine.

GAS CONSUMER.

Trials which have been made of the Guido Kœrner fire-damp consumer would show that it is an invention of some practical value and not merely noteworthy for its ingenuity. Mr Kœrner, finding that the metal palladium possessed the property of decomposing fire-damp rapidly at a temperature of about 480 F, which is below the red heat required for its ignition, has constructed a lamp, of which the following description is given. The apparatus consists of an oil reservoir having five burners, to the upper end of each of which is attached a plate carrying a shell of asbestos impregnated with platinum and palladium. The over-heating of the reservoir and asbestos shells is prevented by fine wire netting. An aperture in the top of the asbestos shells, in which the combustion of the oil is effected, permits the entrance of the necessary air. Trials have been made at several German collieries, and have proved that it rapidly consumes gas so as to allow of work with open lights in uprisings which could scarcely be entered before. From these experiments it has been found that it consumes gas at the rate of 30 cubic feet per minute.

In Westphalian mines it is said to be now a common practice, instead of driving the ordinary rise heads, etc., with their concomitant difficulties of gas and bad air, to make a preliminary holing by means of rotary hand drills. The Hussman drill, which is worked by two men, has a 13-inch bit, and the core is split by a smaller bit. Four men, working by turns, including all time for stoppages, made from 34 to 36 feet per shift. Similar results have been obtained from the Munscheid drill. It is urged that although the use of these machines does not suffice for ventilation or the removal of large quantities of fire-damp, yet the subsequent work of driving the headways is done with greater safety and lessened expense.

Fleuss' patent noxious gas apparatus was satisfactorily tested at the re-opening of the Maudlin seam Seaham Colliery. The apparatus consists of a rubber bag worn on the back, and connected with another placed on the breast. At the bottom of the bag on the workman's back is a cylinder containing enough oxygen gas under pressure to supply four hours' respiration. The upper part of the bag contains the filtering apparatus, which absorbs the carbonic acid gas exhaled by the wearer. The remaining air is enriched by the oxygen, and breathed again and again until the oxygen reservoir is exhausted.

MECHANICAL VENTILATORS.

I give the following table, condensed from the Report of the Committee on Mechanical Ventilators, appointed by the North of England Institute of Mining Engineers, in 1878, and published in the last volume of their transactions, as it will prove interesting to those contemplating the erection of mechanical ventilators in this Province. The results given are those obtained from the machines as far as possible working under ordinary conditions, and reference to the report itself is recommended for full details. While the subject is alluded to here, I would remark that the tendency in Nova Scotia is, in my opinion, to erect ventilators which, while answering all requirements at the present moment, are too small in view of operations calculated to extend over a number of years:—

TABLE OF EXPERIMENTS WITH VENTILATING APPARATUS.

Number	Description of Ventilator.	Situation.	Dimensions of Ventilator.			General Results.			Effective Areas.		
			Diameter.	Width.	Theoretical capacity.	Diam. of Inlet.	Volume of Air.	Mean W. G. Drift Door, inches.	Useful effect Drift W. G. P. c.	Down-cast.	Upcast.
1	Guibal	Hilda Colliery, South Shields	ft. in. 50 . 0	ft. in. 12 . 0 inlet 6 . 6 periphery 1 . 5	.....	ft. in. 15 . 0	108,422	3.30	40.00	124.7	107.69
2	Waddle	Celynyn Col., S. Wales,	45 . 0	.....	.....	15 . 0	163,312	3.08	52.79	293.48	254.46
3	Schiele	Car House Colliery, Rotherham	9 . 6	.....	.....	8 . 0	106,570	2.03	49.27	99.2	.....
4	Do.	Cotton Wood Colliery, Barnsley	12 . 0	.....	.....	.....	157,176	1.91	46.12	313.5	170.65
5	Guibal	Pemberton Colliery, Wigan	46 . 0	.....	.....	13 . 0	246,509	1.85	52.95	408.13	465.24
6	Do.	Cannock Wood Coll., Staffordshire	40 . 0	.....	.....	14 . 0	170,581	1.46	47.95	225.2	191.48
7	Lemielle	Page Bank Colliery, Durham	chamber 22 . 6 drum 15 . 0	height 32 . 0	{ at 9.9 strokes 108,900 }	.....	47,307	1.37	23.40	.....	.....
8	Struve	Cwn Avon Coll., South Wales	2 pistons 18 . 3	stroke 7 . 0	{ at 6.5 strokes 47,827 }	.....	43,793	5.11	57.80	80.05	104.78
9	Nixon	Navigation Coll., South Wales	2 pistons 30 ft. long 20 ft. high	stroke 7 . 0	{ at 7.19 strokes 120,790 }	.....	72,595	2.74	45.91	122.28	66.00
10	Roots	Chilton Colliery, Durham.	2 drums 25 . 0 2 drums	13 . 0	{ at 16.71 revol. 96,918 }	.....	89,772	3.29	47.84	.....	.....
11	Cooke	Hutton Henry Colliery, Durham	15 ft. casing 22 . 0	.....	{ at 17.92 revol. 80,640 }	.....	54,190	1.12	37.33	78.81	158.79
12	Goffint	Horloz Colliery, Liege	2 pistons 13 . 2	stroke 10 . 7 $\frac{1}{2}$	{ at 9.25 strokes 53,020 }	.....	36,286	.71	25.79	153.7	127.67

FALLS OF ROOF, ETC.

In our coal mines as well as in all other coal producing countries the number of accidents from falls of roof and sides forms a large percentage of the total number of accidents.

This subject has been enquired into by a committee of the Mining Institute of Scotland and their recommendation is as follows: That in their opinion the north of England system of timbering by deputies is not satisfactory, and that they prefer the plan that in each seam worked at a colliery there should be a rule laid down by the manager stipulating the extreme distance between the props, etc.

In Nova Scotia, it has been left chiefly to the colliers, under the direction of the chargemen. This system, while working well in mines having a roof of uniform quality, or one secured naturally to some extent by casting on one of the upper plies of the coal, is not so satisfactory when applied to treacherous roofs and thick seams. The passage across the working places of lypes inclining obliquely to each other, and the presence of "kettle bottoms," demand a caution and experience which the collier gains only by long experience. In mines presenting these dangers the various chargemen should omit no opportunity of pointing out to the less experienced workmen the wedges, etc., formed by lines of fracture both in the roof and coal, and the support they should receive until the workings pass the line of danger, etc. It is sometimes observed that the supports are carelessly put in, and not placed so as to meet the line of greatest pressure. The use of cap pieces is frequently abused, for in many cases they are so placed as to form little more than wedges splitting the trees. Attention to these small details has much to do with the safety of the working places, and indirectly affects materially the cost of the coal, as a fall of roof frequently costs for its removal many times the value of the coal formerly supporting it.

ELECTRIC LIGHTING OF MINES.

The subject of electrical lighting of our coal mines has been advanced another step during the past year. Full information as to the latest results effected was given by Mr. A. Jamieson before the British Association for the Advancement of Science. He detailed the results of the practical trials made at Peaseley and Earnock Collieries, which proved successful, and served the important purpose of pointing out some practical defects. He showed working models of strong lanterns encasing Swan's lamps, and of airtight contact makers, for preventing the spark, which always takes place on disconnecting lamps or wires, from causing danger in a fiery pit. It was shown that the plan of joining a number of Swan lamps in single parallel with a self-exciting Gramme or Siemens, or other form of dynamo-machine, was neither the most convenient nor economical, from the fact that the lamps require to be made of a slightly decreasing resistance in proportion to their distance, and, without a costly and delicate current regulator there was risk that when a number were extinguished, of injuring those remaining. He said that the plan of introducing resistance, equivalent to that of the lamps turned off, amounted to throwing away so much power. Several plans were discussed which were, in Mr. Jamieson's opinion, well adapted for joining up lamps.

It was stated that with the experience gained at the Peaseley Colliery, which was considered a very safe one, arrangements were being made to carry out the lighting by electricity of Risca pit, one of the most dangerous in England.

A self-contained portable Swan lamp was shown, which could be kept lighted by two cells of Faure's secondary battery, weighing 10 lbs., for six hours, with an illuminating power of two candles. The cells could be charged afresh by attaching it to a dynamo-machine placed in any convenient part of the pit, so that the lamps need never be taken to the surface.

The introduction of the Faure secondary battery marks an important step in the adaptation of electricity, not only to mines, but for many domestic and public purposes. Sir W. Thompson states that the waste of stored energy is unimportant, and that the power remains practically intact for several weeks. By means of this battery, the dangers attending the employment of conducting wires can be avoided and the miner could carry a store of electrical energy in his lamp, as he now carries oil, sufficient for his shift, and allowing him the advantage of being able to place the lamp in any desired position.

The question of the adoption of electrical lights for the working faces of collieries has yet to pass the test of practical use. Should this point be satisfactorily settled, then the comparison of cost between them and oil lamps will practically decide their general introduction.

At present, however, electricity is found to be extremely useful in lighting halls, docks, etc., and would be a very good exchange for the dangerous paraffine lamps, fire-baskets, etc., now used at our collieries for lighting the bankhead, screens, etc.

SURVEYS.

As the subject of correct surveys of underground workings is becoming annually of increased importance in this Province, I insert the following article, taken from the London Mining Journal, which, setting forth the unsatisfactory state of underground surveying in England, applies with equal force to Nova Scotia:—

“Recent events in connection with mining operations show most forcibly the great importance of having the working plans of mines almost mathematically correct, yet we have had plain proofs that many, considered in every way most reliable, have been just the reverse. Many of the mining surveys now in use cannot be relied on within five or ten yards at a distance from the shafts, and the protracting of one line from the preceding ones, and so on in succession, perpetuates every error, and is a system that should not be adopted by the mining engineer. In many instances the taking of the magnetic variations has been entirely disregarded, and this has led to many errors appearing on plans. In taking the meridian, there is a great deal of difference in the observations taken on one day and that taken on another. The needle is affected unequally by the atmosphere, beside being subject to a diurnal variation, it is also deflected by electrical disturbances, such as the ‘northern lights,’ which are felt though unseen during the day.

The variation of the seasons, the heat of the sun, the presence of iron in the brass of the compass, all make the thoughtful surveyor discard the compass whenever he can, and fall back on the theodolite, an instrument capable of giving very accurate results and furnishing ready means of checking its work.

As to old mining plans, as a rule, it is no doubt correct to say that if they

were now brought into use, to have the workings correctly carried on such could not be done without going and comparing them or getting the true meridian again. But it has been stated by one of our mining engineers, who has paid a great deal of attention to the subject, that by adopting the solar meridian there would be a universal similarity in all plans, as every plan would be drawn on its proper meridian. Every plan throughout the country would be as parallel as possible, and by that means they would be able to compare them at once. However, the taking of the solar meridian as yet has not been adopted by many of our mining engineers, who consider it of more importance to know the variation of the compass from a certain line. Still it has its advocates, whose number will in all probability increase, for it has its attractions, especially amongst the young members of the profession.

One of the simpler methods by which the meridian can be approximately determined, is by drawing a thin rod vertically on a drawing board or some level surface, the shadow cast by the rod being measured a short time before midday, and the vicinity marked. Through the point with the rod as a centre the arc of a circle is struck, when the extremity of the shadow again touches the arc after midday, the point where it touches is marked, and midway between the extremities of the two shadows may be found the point, which is in the same meridian as the rod itself. It is most desirable for future reference to mark by strong stakes at several chains distance on either side of the shaft the meridional line which has been taken as a base for the survey. In the surveying of boundary lines on the surface, or of the mainways in the skeleton of the survey underground, the compass should be entirely discarded. Where very great care has not been taken it may be said the use of the magnetic needle underground, where the greatest accuracy is so necessary, has led to many errors, which have led to litigation and loss of time by driving in the wrong direction. Surveying, however, can be done without a needle, especially where there is only one shaft, and this can be effected by two thin copper wires carrying heavy weights at the bottom immersed in buckets of water to diminish the oscillation, a deal straight edge being fixed so as almost to touch each wire at right angles to the line between them. The extremes of six or ten successive oscillations should be marked with a pencil on each straight edge, and the mean taken with a pair of compasses, and the wires fixed to such mean points. Standing behind the wires the surveyor should next send a candle along the heading as far as it could be seen, and fixed in a line with the wires, and this operation should be repeated in the opposite direction, placing a candle against one of the wires, and to check the whole it should be seen whether the three candles are exactly in line. The latter being the basis of the whole underground survey should be permanently marked by a few pegs driven into the roof with nails in them, or by some other marks. On the surface permanent pegs should be placed at some chains distance on each side of the shaft in a line with the wires. By this means there is obtained a line on the surface exactly corresponding with the base line of the operations underground.

This system has been found to be a really good one after the most severe tests that it was possible to have, not only in ordinary mining but in tunnelling as well. Surveys for the purpose of ascertaining the extent and direction of underground workings should be so trustworthy and accurate as to enable the surveyor to show from his map or plan the very points on the surface below which the mineral has been taken away, and to what extent the subterranean excavations have extended. This under ordinary circumstances he can do by taking the horizontal dimensions of the surface area, and then unite the horizontal dimensions of the areas from which the mineral has been excavated beneath. Another means frequently used in surveying,

was by having three stones in a line, and testing the compass frequently, when a correct survey could be ensured by a competent surveyor, and this could be done in thin seams of minerals where the theodolite could not be brought into use. Still, in making surveys of mines there can be no question as to the importance of the taking accurate note of the magnetic variations, so as to ensure the accuracy of mining plans, and these have at many places been entirely ignored, and with serious consequences to the owners of mines. In one case we are told of two beds of coal which were worked simultaneously according to the plans, and the result was that there was a difference of several chains, which greatly astonished the engineers. Only recently, too, in an action tried in one of the superior courts, heavy damages were awarded to a mineowner for trespass and getting minerals by the party who had gone beyond his boundary, owing to the inaccuracy of the plans. However, the importance of accurate plans in connection with every description of mining operations cannot be too forcibly expressed, nor can the best known systems be too often brought under the notice of mine managers and mining engineers, on whom so much responsibility rests for the safety of those employed under them, as well as for the security of the property placed in their keeping."

WIRE ROPES.

In a paper contributed to the Transactions of the Engineers' Club of Philadelphia, of which an abstract is given by the Engineering and Mining Journal, Dr. H. M. Chance gives the following valuable table, showing the tonnage raised by twenty-three wire ropes used at eleven different slopes in the anthracite coal regions on dips ranging from fifteen to sixty degrees; and the tonnage of six ropes at three shaft collieries. Nearly all of these ropes were made by the Roebling Company; are of seven strands of nineteen wires each, and were in use at some period from 1875-1880. The first cost of the ropes is calculated from Roebling's price list for October, 1880.

SLOPE.	No. of ropes.	Diam. Inch.	Length Feet.	Cost.	Tons.	Total tons.	Cost per ton	Cost per 100 feet lift.
1.....	6	1 $\frac{3}{4}$	900	\$3,240	66,616	375,700	0.86	0.095
2.....	2	2	1,000	1,520	98,280	196,560	0.77	0.077
3.....	1	1 $\frac{3}{4}$	850	510	203,700	203,700	0.25	0.029
4.....	2	1 $\frac{3}{4}$	1,000	1,200	37,175	74,350	1.61	0.161
5.....	1	1 $\frac{1}{2}$	1,200	546	37,500	37,500	1.47	0.122
6.....	1	1 $\frac{3}{4}$	1,100	660	77,700	77,700	0.85	0.077
7.....	2	1 $\frac{3}{8}$	950	760	41,825	83,650	0.90	0.094
8.....	1	1 $\frac{1}{2}$	950	428	70,950	70,950	0.60	0.063
9.....	1	1 $\frac{3}{8}$	675	304	102,200	102,200	0.29	0.043
10.....	4	1 $\frac{3}{4}$	820	2,952	149,037	596,150	0.50	0.061
11.....	2	2	1,050	1,596	166,650	333,300	0.48	0.046
Averages and totals, 23		.....	933	\$13,710	93,555	2,151,760	0.64	0.069
SHAFTS.								
1.....	2	1 $\frac{3}{8}$	925	\$1,100	88,715	177,450	0.63	0.068
2.....	2	1 $\frac{3}{4}$	635	762	117,180	244,360	0.32	0.051
3.....	2	1 $\frac{1}{4}$	500	350	86,222	172,445	0.20	0.041
Averages and totals, 6		.....	687	\$2,222	97,376	584,255	0.38	0.053

In these tables, says Dr. Chance, the cost has been estimated by the actual tonnage (exclusive of the weight of the mine cars) raised. The coal raised does not exceed two thirds of this amount, but the value of the discarded rope, estimated at one third its cost, has been considered an equal offset, and the figures given may, therefore, be taken as the average cost per ton of merchantable coal.

The following ingenious apparatus for loading and unloading pit-cages, known as Fisher's patent, may be found suitable for adoption in some of our collieries.

The apparatus may be briefly described as follows: The cage rails, instead of being fastened to the cage itself, are swung on axles working in bearings attached to the cage, and are fitted at one end with "L" pieces, and at the other end with deflecting levers, arranged to project below the bottom of the cage in such a manner that when the cage settles on the keps they incline the rails of the cage, so that when the cage has settled the tubs run by their own gravity on to the sheets, the tilting of the rails having previously deflected the front stops on the cage which keep the tubs in place. Simultaneously the platform in rear of the cage holding the empty tubs, standing in rails, and attached to four carrying levers, working in bearers under the rails, are automatically raised by a small cylinder (actuated by steam) to a similar inclination with, and in the same line as, the cage rails. This action drives the empty tubs down the incline into the cage, where they are arrested at the proper place by the front axle of the first loaded train striking a lever which releases the front stops on the cage. On the completion of the loading, the rails fall to their proper place in the cage as it rises, and the cessation of pressure on the engine lever allows the empty tub platform to resume its position. Corresponding arrangements can be used at the pit bottom.

This apparatus is said to have been in successful use at several collieries for some years, and to have effected a considerable saving in time and in the number of banksmen and bottomers.

At a late meeting of the Manchester Geological Society, Mr. Dickinson, H. M. Chief Inspector of Mines, showed an apparatus which had been adopted in several collieries, and records, by its attachment to the engine of the ventilating apparatus, the fluctuations in pressure of the air passing through the mine up to a water gauge of 6 inches, and the corresponding speed of the engine.

The following papers relating to the Geology and Mineralogy of Nova Scotia, have been published during the past year :

E. GILPIN. Occurrence of Lievrite in Nova Scotia. Inst. Nat. Science.

E. GILPIN. Trap Minerals of Nova Scotia. Ibid.

A. A. HARE. Geology of Bedford. Ibid.

DR. HONEYMAN. Geology of Digby and Yarmouth Cos. Ibid.
Archæan Gnesis of the Cobequids. Ibid.

I purposed noticing several proposed improvements in gold milling appliances, but in view of the early date at which this report is required, I have deferred their consideration to a future time.

I have the honor to be, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,

Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

No.	LESSEE.	DISTRICT.	Area Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, Sarah, and others .....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al	Tatamagouche	10½
LEAD.			
HALIFAX COUNTY.			
1	McClure, Charles F	Gay's River	1
IRON.			
PICTOU COUNTY.			
35	Carmichael, John R	East River	1
43	Hudson, James	"	1
CAPE BRETON COUNTY.			
86	Brookman, S. J., et al	N. Side East Bay	1
91	Brookman, Phoebe	East Bay	1
92	Matheson, D., et al	"	1
93	Brookman, S. J., et al	"	1
84	Protheroe, Pryse	Cow Bay	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co	Whycocomah	1
Total Area under lease			20½ square miles.

LIST OF COAL LEASES.

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
1	McKinnon, et al	ANTIGONISH CO.	3			
44	Baker, John W		1			
13, 14, 15	Black, C. H. M.		3			
21	Blight, James, et al		1			
47	Boston, C. M. Co		1		John Moffat	River Herbert
25	Campbell, Alex., et al		1			
32, 34	Campbell, Alex., et al		2			
35, 48, 49, 50	Campbell, Alex.		4			
31, 33, 37, 38, 40, 41, 45, 46	Campbell, John		8			
12	Cumberland, C. M. Co		4	Working.	R. Redpath	Maccan
17	Donville, James		3		E. N. Sharp	St. John, N.B.
	Joggins, C. M. Association	Joggins	2		B. B. Barnhill	Joggins
	Joggins, C. M. Co.	Cumberland	2	Working.		
20	Kirby, Lewis R.		1			
18, 19	Livesey, John		2			
5	Lawsen, C. M. Association	Maccan	1			
42	Macfarlane, Alex		1			
51	Milner, Christopher		1			
53	Milner, Christopher		1			
1, 2, 3, 4	New York & Acadia Co	Scotia	4	Working.	William Bennett.	Maccan

43	Pugwash & Spring Hill R. Co.	.....	1	Working.	<i>William Hall</i> ..	Spring Hill.
16	Seaman, Gilbert	.....	1	.....	" ..	"
24	Shannon, S. L.	.....	2	.....	J. S. Hickman ..	Amherst.
36, 39	Shannon, S. L., (in trust) et al	.....	2	.....	
6, 7, 8	Spring Hill Mining Co.	Spring Hill	3	.....	
52	"	"	4	.....	
22, 23, 28, 29, 30	Styles Mining Co. (Limited)	.....	5	.....	
9	Victoria Coal Mining Co.	.....	2	.....	
26, 27	Wright, John V.	.....	3	.....	
			66			
			PICTOU CO.			
1	Acadia Coal Co.	Fraser	1	Working.	{ H. S. Poole	Stellarton.
3	" "	Acadia	1	"	{ <i>J. Macawell</i>	Westville.
42	" "	Pictou	4	.....	
23	Allan, Sir Hugh, K't.	Vale	3	Working.	{ J. B. Moore	New Glasgow.
10	Gray, B. G.	.....	1	.....	{ <i>John Greener</i> ..	Vale Colliery.
11	Haliburton, R. G., et al.	.....	1	.....	
			4	Working.	{ S. Cunard & Co. Halifax.	
			2	Working.	{ <i>John Rutherford</i> . Stellarton.	
13, 14	Intercolonial Company.	Albion	4	.....	Robert Simpson ..	Westville.
12	" "	Drummond	1	.....	
6	Kirby, Lewis R.	.....	1	.....	
15, 30, 31	Merigomish Company	.....	3	.....	
25	Nova Scotia Company	Black Diamond ..	4	.....	H. L. Angel	Westville.
20	Price, D. E., et al	.....	2	.....	
24	Richey, M. H.	.....	1	.....	
			29			

LIST OF COAL LEASES—(CONTINUED.)

No.	LESSE.	COLLIERY.	Area. Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
		CAPE BRETON CO.				
3	Archibald, Blowers.....	Gowrie.....	1	Working.	{ Archibald & Co. { Chas. Archibald.	North Sydney. Cow Bay.
2	Archibald, Thos. D. . . .	"	1			
5, 28	Blockhouse Mining Co	Blockhouse	2	Working.	R. Belloni	Cow Bay.
29	" " (sea area)	.....	1			
72	Brookman, Samuel.....	.....	1			
76, 77	" S., et al... ..	.....	2			
15	Caledonia C. & R. Co.....	Caledonia.....	1	Working.	David MacKeen .	Caledonia Mines.
31	" (sea area).....	.....	1			
30	Campbell, Alex.....	.....	1		T. D. Archibald..	North Sydney,
23, 25, 70	Cape Breton Co., (Limited) ..	.....	3		{ D. J. Kennelley. { Joseph Simpson.	Louisburg. Reserve Mines.
14, 24	" " " "	Schooner Pond ..	2	Working.	" "	
49	" " " "	Reserve	1		" "	
64, 65, 68	" " " "	Lorway	3		" "	
69	" " " "	Emery	1		" "	
8, 9	Clyde Coal Mining Co.....	Ontario	1½	Working.	John Sutherland.	Port Caledonia.
87	Cossit, Geo. G.....	.....	1			
	General Mining Association..	Bridgeport.....	2	Working.	{ Rich. H. Brown. { Cunard & Morrow.	Sydney Mines. Halifax.
	" " " "	Sydney	5			
	" " " "	"	12			
	" " (sea area).....	"	5		{ Richard Wilson. { Donald Lynk.	Sydney Mines. Lingan.
27	" " " "	Lingan.....	10	Working.		
	" " " "	"	4			

38, 39	"	"	Lingan.	10			
10, 21	Gibson, John, et al	"	"	2	Working.	{ E. P. Archbold. Henry Mitchell.	Halifax. Little Glace Bay.
4, 12, 16	Glace Bay Mining Co.	"	Glace Bay..	3			
75	Henry, W. A.	"	"	1			
22	Ingraham, R. J. and J. L.	"	Halfway	1			
6, 13, 18, 19	International C. & R. Co.	"	International	4	Working.	{ R. Beilioni P. Johnstone....	Cow Bay. Bridgeport.
71	Jennings, Edward.	"	"	1			
47	LeCras & McInnes.	"	"	1			
66	Merchant's Bank of Canada	"	Gardener	2			
74	Moore & Moseley	"	"	1 $\frac{1}{4}$			
81	Morton, Lemuel J.	"	"	1			
80	McDonald, James	"	"	1			
52, 53	McLeod, Hugh	"	"	2			
88, 89, 90	Paint, Henry N. and others.	"	"	3			
83, 85	Protheroe, Pryse.	"	"	2			
73, 82	Reid, Thos. S., (sea area)	"	"	2			
40, 41, 42	Ross, H. E., et al.	"	"	3			
79	Ross, W. J., et al., (sea area).	"	"	1			
43	South Head Coal Co	"	South Head	1			
32	Sword, Wm., (sea area).	"	"	3			
54 to 63	Sydney C. M. Co., (sea areas).	"	"	10			
46	Todd, A. Thornton	"	Collins	1			
67	Weatherbe & Kirby	"	"	1			
78	Weatherbe, R. L., (sea area).	"	"	5			
34, 35, 36	Victoria C. M. C., (sea area).	"	Victoria	5			
50, 51	"	"	"	2			
				130 $\frac{3}{4}$			

LIST OF COAL LEASES.—(Continued.)

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
		INVERNESS CO.				
5	Aylmer, John Evans Freke..	Cape Mabou	2			Moncton
8	Evans, Thomas	Chimney Corner..	1			Broad Cove
9	Evans, Thomas, (<i>sea area</i>) ..	.....	1			
7, 12	Inverness C. I. & R. Co. ....	.....	2	Working.	{ Alex. Wright ..	
13	Murray, George.....	Port Hood	3		{ D. McKay	
4	Richey, M. H., et al .....	.....	1			
11	Ross, W. J.	Broad Cove	1			
6	Ross, H. E. at al., (<i>sea area</i>) ..	.....	1			
14, 15	Smyth, Peter .....	.....	2			
10	Tremaine, E. D., (<i>sea area</i>) ..	.....	1			
17	McDonald, Hugh .....	.....	1			
		RICHMOND CO.	16			
2	Marmaud, A. E.	Little River	1			
		VICTORIA CO.	1			
2	Campbell, Chas. J.	New Campbellton	3	Working.	John McDonald..	New Campbellton..
3, 4, 5	Ross, William	Black Rock	5			
			8			
Total area under lease.....			..... 255½ square miles.			

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	37,606	42,717	67,325	54,006	34,226	6,495	245	45	139,402	103,263
2nd Quarter	45,112	33,673	73,898	69,301	148,394	134,457			267,404	237,431
3rd Quarter	45,081	42,647	119,212	120,144	227,350	233,821			391,643	406,007
4th Quarter	55,620	52,112	111,762	103,517	158,439	142,079			325,821	288,313
Total	183,419	171,149	372,197	346,968	568,509	516,852	245	45	1,124,270	1,035,014
1880	143,085	134,671	461,811	434,922	422,884	380,848	4,930	4,218	1,032,710	954,659
1879	99,222	90,671	388,486	330,878	295,984	262,924	4,579	4,151	788,271	688,624
1878	113,873	104,869	315,395	288,403	340,056	299,055	1,279	1,184	770,603	693,511

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.		GRAND TOTAL.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia—											
Land sales.....	27,120	15,143	93,029	56,755	2,502	6,074	45		122,696	77,972	200,668
Sea-borne	1,919	36	41,901	9,543	117,276	11,070			161,096	20,649	181,745
Nova Scotia—Total..	28,989	15,179	134,930	66,298	119,778	17,144	45		283,722	98,621	382,413
Quebec	34,442	1,106	81,882	1,555	145,159	4,484			261,483	7,145	268,628
New Brunswick.....	57,137	33,128	3,852	1,250	28,133	26			89,122	34,404	123,526
Newfoundland			1,231		60,472	471			61,703	471	62,174
P. E. Island			15,690	19,211	12,961	1,451			28,651	20,662	49,313
West Indies			1,325		20,295				21,620		21,600
United States	1,118		18,410	1,081	52,187	40,932			71,715	42,013	113,728
Other countries.....			253		7,664	5,695			7,917	5,695	13,612
Total	127,756	49,413	257,573	89,395	446,649	70,203	45		826,003	209,011	1,035,014
1880	99,491	35,180	326,870	108,052	346,103	34,745	4,218		776,681	177,977	954,659
1879	71,700	18,881	255,674	75,204	243,290	19,664	4,151		574,905	113,719	688,624
1878	84,244	20,625	198,641	89,762	277,914	21,141	1,184		561,893	131,528	693,511

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1881.	Year 1880.
Nova Scotia.						
Land Sales....	51,914	42,377	47,659	59,718	200,668	184,837
Sea borne	7,751	35,890	66,030	72,074	181,745	168,076
N. Scotia—Total..	59,665	78,267	113,689	130,722	382,413	322,913
Quebec	12,650	85,237	129,911	40,830	268,628	239,091
New Brunswick..	16,889	29,594	35,205	41,838	123,526	97,817
Newfoundland ..	660	11,489	28,616	21,409	62,174	69,627
P. E. Island .....	.....	9,114	19,406	20,793	49,313	46,767
United States....	3,153	23,135	57,264	30,176	113,728	123,423
West Indies	1,202	5,055	4,054	11,309	21,620	12,165
South America ..	.....	.....	.....	561	561	.....
Europe .....	.....	4,584	8,467	.....	13,051	12,857
Total	94,219	246,475	396,612	297,708	1,035,014	954,659
1880..	76,644	224,138	403,909	249,968	954,659	688,624
1879..	58,123	163,508	259,817	207,176	688,624	954,659

COAL.—GENERAL STATEMENT.

1881.	Produce.	Sales.	Colliery Consumption.
1st Quarter..... tons	139,402	103,263	27,450
2nd Quarter..... "	267,404	237,431	24,292
3rd Quarter..... "	391,643	406,007	23,871
4th Quarter..... "	325,821	388,313	31,475
Total.....	1,124,270	1,035,114	107,888
1880	1,032,710	954,659	96,831
1879	788,271	688,624	84,787
1878	770,603	693,511	88,627

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31st, 1881.

COLLIERIES.	SEAMS.	PRODUCE.	SALES.			COLLIERY CONSUMPTION.			
			Paying Royalty.	Free.	Total.	Per Cent.	Engines.	Workmen.	Per Cent.
CUMBERLAND COUNTY.									
Chignecto.....	North Seam.....	3,294	1,974	865	2,839	86	400	130	.....
Joggins.....	Joggins Main.....	18,880	18,700	2,173	15,873	84	1,507	182	10
Mindie.....	.....	400	200	200	400	100	.....	.....	.....
Scotia.....	North Seam.....	260	240	50	290	.....	.....	.....	.....
Spring Hill.....	Black & South	160,485	105,022	46,125	151,747	94	4,705	4,092	5
Styles.....	Styles.....	150	.....	.....	.....	.....	.....	.....	.....
PICTOU COUNTY.									
Acadia.....	Acadia.....	87,582	59,545	21,801	81,346	92	5,422	1,696	8
Albion Mines.....	Third & McGregor.....	59,316	26,907	24,738	51,645	87	11,913	2,724	24
Intercolonial.....	Acadia.....	135,084	99,521	27,586	127,107	92	5,113	2,449	5
Vale.....	McBean.....	90,215	71,600	15,270	86,870	94	10,177	1,168	11
CAPE BRETON COUNTY.									
Block House.....	Blockhouse.....	61,108	56,754	95	56,849	93	2,800	1,404	7
Caledonia.....	Phelan.....	43,426	32,096	10,837	42,933	98	1,180	698	4
Glace Bay.....	Harbour.....	35,012	28,536	3,075	31,611	90	2,870	979	10
Gowrie.....	McAulay.....	64,180	50,368	11,001	61,369	95	1,130	1,241	5
International.....	Harbour.....	76,860	61,107	15,178	76,285	99	1,415	1,317	3
Lingan.....	Lingan.....	34,402	26,909	5,467	32,376	91	1,912	742	7
Ontario.....	Phelan.....	15,117	11,460	1,950	13,410	88	569	221	5
Reserve.....	Phelan.....	76,727	57,941	10,943	68,884	89	3,136	1,293	5
Sydney.....	Main.....	161,577	121,478	11,657	133,135	82	23,177	8,436	19
INVERNESS COUNTY.									
Broad Cove.....	.....	45	45	.....	45	.....	.....	.....	.....
VICTORIA COUNTY.									
New Campbellton.....	.....	200	.....	.....	.....	.....	340	150	.....
RICHMOND COUNTY.									
Little River.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	1,124,270	826,003	209,011	1,035,014	90	78,166	28,922	9

Statement of the Numbers and Classes of Persons employed, and average results of each Colliery, during the year ended December 31st, 1881.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.		TOTAL.		AVERAGE NO. OF DAYS PER PERSON.		Average No. of ton per skilled laborer underground.	Average tons per day per skilled labor underground.	Average quantity raised per day.	HORSES.		PITS WORKED.
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Mechanics.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Persons.	Underground.	Above ground.	Above.				Below.		
CUMBERLAND CO.																				
Chignecto	11	3	2	4,009	4	3	2	2,039	31	8,639	56	14,737	20	268	299	1.4	16	3	3	208
Joggins	50	3	12	14,055	13	12	8	9,101	1	88	99	23,244	216	270	376	1.6	82	5	4	239
Scotia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spring Hill	166	67	50	74,080	30	64	13	27,477	2	550	392	102,107	261	256	966	3.7	620	3	16	257
Styles .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pictou Co.																				
Acadia	95	46	22	39,785	15	39	7	16,657	6	1,394	230	57,836	244	270	920	3.7	355	6	6	246
Albion	109	38	28	43,329	48	114	34	59,705	47	10,100	418	113,124	248	280	544	2.3	251	26	2	236
Intercolonial	133	65	57	66,299	33	50	8	26,550	6	1,113	352	93,962	260	285	1,015	3.5	489	8	10	288
Vale	169	20	13	51,092	30	23	6	24,015	.....	.....	271	75,107	252	300	533	2.4	400	8	10	225
CAPE BRETON CO.																				
Block House	73	7	46	20,444	22	24	5	13,373	.....	.....	177	33,817	162	262	1,050	6.3	466	14	23	165
Caledonia	50	10	10	15,250	17	24	8	10,859	3	680	122	26,789	217	221	686	3.7	237	5	8	183
Glace Bay	45	3	6	10,298	19	16	3	9,326	.....	.....	92	1,624	190	245	778	4.0	182	6	4	192
Gowrie	88	9	40	28,470	14	30	14	14,519	.....	.....	195	42,989	208	250	727	3.6	343	5	29	187
International	97	10	39	31,534	19	41	4	17,179	.....	.....	210	48,713	216	268	792	5.0	483	4	24	159
Lingan	51	2	14	16,123	3	22	10	8,596	.....	.....	102	24,719	240	245	674	2.4	124	4	6	283
Ontario	28	3	4	4,411	5	8	2	2,709	.....	.....	57	8,248	128	180	540	4.0	112	5	4	134
Reserve	122	12	35	38,684	13	14	4	13,424	.....	.....	200	52,288	229	300	628	2.8	347	5	16	221
Sydney	225	45	82	91,936	80	100	36	63,516	.....	.....	569	155,452	260	290	717	2.6	600	16	37	269
INVERNESS CO.																				
Broad Cove	1	.....	.....	36	.....	.....	.....	.....	.....	.....	1	36	.....	.....	.....	.....	.....	.....	.....	.....
VICTORIA CO.																				
New Campbellton	5	1	2	741	2	1	1	698	.....	.....	1	1,439	.....	.....	.....	.....	.....	.....	.....	.....
Richmond Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little River .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	900	.....	.....	.....	.....	.....	.....	.....	.....
Total	1518	345	462	550,176	367	598	165	319,918	112	24,467	3567	894,961	236	277	740	3.4	.....	123	204	217

COLLIERY CONSTRUCTION ACCOUNT—1881.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machinery.	Colliery Build-ings.	Dwell-ings.	Surface Works.	Rail-ways.	Wharves.	Prospect-ing.	Total.
CUMBERLAND COUNTY.											
Black Mine .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	544 36	544 36
Chignecto .....	.....	6,900 00	.....	14,750 00	6,250 00	3,065 00	4,813 00	9,050 00	.....	.....	45,428 00
Joggins .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Scotia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springhill	150 00	.....	3,779 22	6,666 00	600 00	712 00	4,693 34	.....	.....	50 00	16,655 56
Styles	200 00	150 00	.....	100 00	.....	.....	50 00	.....	.....	300 00	800 00
PICTOU COUNTY.											
Acadia .....	.....	.....	.....	8,132 02	2,297 00	.....	.....	.....	.....	.....	10,429 02
Albion	6,727 11	.....	.....	7,380 26	626 70	390 10	126 47	11,170 08	.....	.....	26,420 72
Intercolonial	307 54	.....	1,758 92	3,106 50	348 61	.....	848 25	50 00	1,907 78	.....	8,327 60
Vale .....	.....	.....	.....	60 00	.....	.....	.....	.....	.....	.....	60 00
CAPE BRETON COUNTY.											
Block House .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caledonia .....	.....	.....	541 00	.....	.....	.....	.....	.....	.....	.....	541 00
Glace Bay .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gownie .....	.....	.....	375 66	.....	.....	.....	.....	250 00	.....	.....	625 66
International .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lingan .....	.....	1,077 60	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario	30 00	104 03	.....	2,799 12	70 00	.....	170 00	1,525 00	.....	.....	1,077 60
Reserve	3,227 80	4,211 51	.....	.....	.....	.....	50 00	.....	.....	.....	4,698 15
Sydney .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,489 31
INVERNESS COUNTY.											
Broad Cove .....	.....	.....	22 50	.....	.....	.....	.....	.....	.....	.....	22 50
VICTORIA COUNTY.											
New Campbellton .....	.....	50 00	.....	.....	.....	.....	.....	.....	.....	.....	50 00
RICHMOND COUNTY.											
Little River	100 00	.....	.....	1,075 00	75 00	125 00	500 00	.....	.....	230 00	2,105 00
Total	7,484 65	10,357 80	11,870 44	44,068 90	10,867 31	4,292 10	11,256 06	22,045 08	1,907 78	1,124 36	125,374 48

Nova Scotia Coal Sales from 1875 to 1881 (inclusive).

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1831	37,170	Forw'd 368,196
1786	2,000		1832	50,396	
1787	10,681		1833	64,743	
1788			1834	50,813	
1789			1835	56,434	
1790			1836	107,593	
1791	2,670		1837	118,942	
1792	2,143		1838	106,730	
1793	1,926		1839	145,962	
1794	4,405		1840	101,198	839,981
1795	5,320	1841	148,298		
1796	5,249	1842	129,708		
1797	6,039	1843	105,161		
1798	5,948	1844	108,482		
1799	8,947	1845	150,674		
1800	8,401	1846	147,506		
		1847	201,650		
1801	5,775	1848	187,643		
1802	7,769	1849	174,592		
1803	6,601	1850	180,084	1,533,798	
1804	5,976	1851	153,499		
1805	10,130	1852	189,076		
1806	4,938	1853	217,426		
1807	5,119	1854	234,312		
1808	6,616	1855	238,215		
1809	8,919	1856	253,492		
1810	8,609	1857	294,198		
		1858	226,725		
1811	8,516	1859	270,293		
1812	9,570	1860	322,593	2,399,829	
1813	9,744	1861	326,429		
1814	9,866	1862	395,637		
1815	9,336	1863	429,351		
1816	8,619	1864	576,935		
1817	9,284	1865	635,586		
1818	7,920	1866	558,520		
1819	8,692	1867	471,185		
1820	9,980	1868	453,624		
		1869	511,795		
1821	11,388	1870	568,277	4,927,339	
1822	7,512	1871	596,418		
1823	27,000	1872	785,914		
1824		1873	881,106		
1825		1874	749,127		
1826	12,600	1875	706,795		
1827	12,149	1876	634,207		
1828	20,967	1877	697,065		
1829	21,935	1878	693,511		
1830	27,269	1879	688,626		
		1880	954,659	7,377,428	
		1881	1,035,014	1,035,014	
			Total....	18,482,156	

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	837,981
1791 " 1800.....	51,048	1841 " 1850.....	1,533,798
1801 " 1810.....	70,452	1851 " 1860.....	2,399,829
1811 " 1820.....	91,527	1861 " 1870.....	4,927,339
1821 " 1830.....	140,820	1871 " 1880.....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	98,173	24 ad.	1866	404,252	\$1.25
1851	116,274	"	1867	338,492	"
1852	87,542	"	1868	228,132	"
1853	120,764	"	1869	257,485	"
1854	139,125	Free.	1870	168,180	"
1855	103,222	"	1871	165,431	"
1856	126,152	"	1872	154,092	.75
1857	123,335	"	1873	264,760	"
1858	186,743	"	1874	138,335	"
1859	122,720	"	1875	89,746	"
1860	149,289	"	1876	71,634	"
1861	204,457	"	1877	118,216	"
1862	192,612	"	1878	88,495	"
1863	282,775	"	1879	51,641	"
1864	347,594	"	1880	123,423	"
1865	465,194	"	1881	113,728	"

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1881.

Sheving the number of Mines at Work, days' labor performed, quantities of Quartz crushed, Yield of Gold, for the year ended December, 31st, 1881.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills Employed.	Steam Power.	Water Power.	Quartz, &c. Crushed.	Yield per Ton.		Maximum Yield per Ton.		Total Yield of Gold.		Average yield per man per day for 12 months at \$18.00 per oz.
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	
Caribou	3	15,426	3	2	1	1661	0	13 14	6	3 16	1,129	18 13	1.31
Gay's River	1	274	...	...	...	...	...	...	...	...	12	14 7	.78
Montagu	2	17,982	2	2	...	1165	0	15 10	3	1 15	900	6 16	.90
Oldham	1	2,471	2	1	1	604	0	10 21	1	7 9	329	10 4	.98
Renfrew	2	5,038	1	...	1	583	0	9 5	1	5 19	269	8 13	.96
Sherbrooke	10	29,285	6	4	2	5,279	0	9 18	5	3 0	2,580	2 20	1.58
Stormont	1	4,332	...	...	...	80	2	3 9	2	3 9	173	10 0	.73
Tangier	3	11,721	3	1	2	716	0	11 3	2	5 7	399	9 16	.61
Uniacke	3	10,003	4	3	1	3,094	0	8 23	2	0 0	1,355	8 21	2.28
Waverley	2	5,517	3	1	2	535	0	14 0	1	18 6	374	0 0	1.32
Wine Harbor	1	5,098	1	...	1	552	1	8 20	3	3 0	795	14 0	2.80
Unproclaimed	4	19,161	5	1	4	2,287	1	1 7	2	1 9	2,436	9 12	2.20
	33	126,308	30	15	15	16,556	0	12 20	6	3 16	10,756	13 2	1.52

MONTHLY STATEMENT FROM EACH GOLD DISTRICT

MONTH.	CARIBOU.							GAY'S RIVER.							MONTAGU.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January	5	876	34	39	19	2	23	1	99	...	...	12	14	7	3	2072	83	271	216	0	18
February	6	1174	47	52	52	18	5	1	90	...	...	.....	.....	.....	3	2017	82	174	66	11	6
March	5	929	26	206	102	11	0	1	85	...	...	.....	.....	.....	4	2182	84	50	26	11	0
April	3	2321	92	167	174	3	6	...	...	...	...	.....	.....	.....	4	1677	67	164	184	7	19
May	3	2127	85	197	133	0	0	...	...	...	...	.....	.....	.....	5	1992	79	149	144	7	2
June.....	3	1593	63	117	107	5	18	...	...	...	...	.....	.....	.....	4	1055	42	120	100	12	11
July.....	4	1670	67	123	146	9	6	...	...	...	...	.....	.....	.....	3	1359	54	.....	.....	.....	.....
August	4	2136	85	165	103	1	21	...	...	...	...	.....	.....	.....	4	1411	56	21	18	3	0
September.....	3	2293	90	305	120	19	0	...	...	...	...	.....	.....	.....	5	1660	66	88	89	10	0
October	1	139	5	51	58	11	0	...	...	...	...	.....	.....	.....	2	947	36	43	35	8	15
November	1	59	2	150	41	6	18	...	...	...	...	.....	.....	.....	2	656	26	68	71	2	20
December	1	117	4	89	69	9	12	...	...	...	...	.....	.....	.....	2	954	38	17	1	10	0
	3	15426	....	1661	1129	18	13	1	274	...	...	12	14	7	3	17982	....	1165	900	6	16

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	OLDHAM.							RENFREW.							SHERBROOKE.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January.....	1	168	11	75	47	9	0	4	640	25	21	28	0	5	10	2506	100	311	201	7	0
February.....	2	242	13	73	27	13	4	4	624	24	20	3	1	0	10	2328	93	374	283	6	0
March.....	.....	.....	.....	14	5	7	0	2	367	15	61	9	1	12	11	2646	105	442	244	18	5
April ..	.....	.....	.....	22	12	13	6	2	398	15	33	7	3	0	9	2340	94	304	146	2	0
May.	1	187	11	58	37	11	18	2	498	20	107	71	19	6	10	2392	95	329	186	5	0
June	1	141	9	57	39	13	12	2	558	22	100	40	2	0	11	2440	97	565	212	16	0
July.....	2	391	19	46	10	2	20	2	386	15	41	16	18	11	12	2340	93	676	263	5	0
August	2	423	16	35	7	13	0	2	332	13	15	3	12	0	10	2808	112	461	198	18	0
September.....	2	297	11	49	43	15	11	2	363	14	30	12	0	3	11	2715	108	615	266	12	15
October.....	2	320	13	41	14	13	8	1	350	14	.....	.....	.....	.....	11	2262	90	364	182	3	0
November.....	1	201	12	62	52	17	9	1	259	10	120	55	11	0	10	2132	85	374	188	5	0
December	1	101	4	72	30	0	12	1	263	11	35	23	0	0	8	2376	94	462	206	5	0
	1	2471	.....	604	329	10	4	2	5038	.....	583	269	8	13	10	29285	.....	5277	2580	2	20

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	STORMONT.						TANGIER.						UNIACKE.								
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwts.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwts.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwts.	Grs.
January	2	243	9	...	...	...	...	3	1523	60	26	22	6	9	4	1555	62	346	181	1	0
February	1	333	13	...	...	...	...	3	1392	55	283	82	1	23	5	1409	56	188	62	1	0
March	1	360	14	...	...	...	...	3	1638	65	214	146	9	5	6	1402	43	472	111	11	0
April.....	1	418	17	...	...	...	...	2	980	39	204	19	10	5	3	1724	68	249	141	11	11
May	1	362	14	80	173	10	0	2	950	38	60	83	5	0	5	1318	52	152	105	2	14
June	1	340	13	...	...	...	...	2	1631	65	...	...	...	...	4	734	29	134	76	6	14
July	1	221	8	...	...	...	...	1	512	22	...	...	...	...	1	47	2	286	154	8	12
August	1	260	10	...	...	...	...	1	516	20	...	...	...	...	1	50	2	222	81	15	3
September	1	707	28	...	...	...	...	1	389	15	29	10	16	17	1	100	4	273	94	16	6
October.....	1	221	8	...	...	...	...	1	326	13	36	2	16	17	2	446	18	172	104	5	18
November	1	260	10	...	..	...	...	2	585	23	64	32	3	18	2	499	20	232	115	8	19
December	1	707	28	...	...	...	...	2	1139	45	...	...	...	...	4	619	25	368	127	0	20
	1	4332	...	80	173	10	0	2	11721	...	716	339	9	16	3	10003	...	3094	1355	8	21

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	WAVERLEY.							WINE HARBOR.							UNPROCLAIMED.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January	2	5517	....	535	374	0	0	1	5098	....	552	795	14	0	4	19161	....	2287	2436	9	12
February	2	674	27	45	31	16	0	1	530	21	25	75	0	0	5	660	26	69	21	15	1
March	2	700	28	48	30	18	11	1	650	26	28	83	0	0	4	965	39	72	186	15	0
April	3	900	36	34	23	17	0	1	568	22	30	59	10	0	4	2023	80	2	0	2	15
May	2	675	27	26	19	1	0	1	450	18	50	26	0	0	4	2580	103	2	0	10	5
June	3	822	33	34	32	14	0	1	....	....	49	53	15	0	4	1286	51	310	319	6	5
July	3	992	39	....	....	....	....	1	....	....	72	105	6	0	4	2025	80	360	424	12	11
August	2	439	17	30	20	12	0	1	480	19	53	33	12	0	2	1665	66	325	355	8	0
September	2	363	15	97	74	0	1	1	469	19	59	29	17	0	2	1680	67	380	433	15	16
October	2	352	14	122	57	0	0	1	514	20	69	46	19	0	2	1613	64	350	366	4	0
November	2	352	14	122	57	0	0	1	514	20	69	46	19	0	2	1613	64	350	366	4	0
December	2	352	14	122	57	0	0	1	514	20	69	46	19	0	2	1613	64	350	366	4	0

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.	Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.		
	Oz.	Dwt.	Gr.	Tons.	Oz. Dwt. Gr.		A day.	A year.	
1862	7,275			6.473	1 2 11	156,000	\$ 83	\$249	
1863	14,001	14	17	17,002	16 11	273,624	92	276	
1864	20,022	18	13	21,434	18 16	252,720	1 42	426	
1865	25,454	4	8	24,423	1 0 20	212,966	2 15	645	
1866	25,204	13	2	32,161	15 2	211,796	2 14	642	
1867	27,314	11	11	31,386	17 9	218,894	2 24	672	
1868	20,541	6	10	32,262	12 17	241,462	1 53	459	
1869	17,868	0	19	35,147	10 4	210,938	1 52	456	
1870	19,866	5	5	30,829	12 21	173,680	2 05	615	
1871	19,227	7	4	30,791	12 11	162,994	2 12	636	
1872	13,094	17	6	17,093	15 7	112,476	2 09	627	
1873	11,852	7	19	17,708	13 9	93,470	2 28	684	
1874	9,140	13	9	13,844	13 5	77,246	2 12	636	
1875	11,208	14	19	14,810	15 4	91,698	2 20	660	
1876	12,038	13	18	15,490	15 13	111,304	1 94	582	
1877	16,882	6	1	17,369	19 10	123,565	2 46	738	
1878	12,577	1	22	17,990	13 23	110,422	2 05	615	
1879	13,801	8	10	15,936	17 8	92,002	2 34	702	
1880	13,234	0	4	14,037	18 20	103,826	2 18	54	
1881	10,756	13	2	16,556	12 20	126,308	1 52	456	
Total.	321,362	18	7	412,741	.....	3,157,191	.....	.....	.....

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

GYPSUM EXPORTS—Ton of 2,000 lbs.

Windsor.....	Tons.	70,853	Value.....	\$70,786
Hantsport	"	5,665	"	5,405
Cheverie	"	26,785	"	18,190
Walton	"	3,830	"	2,752
Total.....	"	107,133	"	\$97,133

BUILDING STONE.

Antigonish	Tons.	17	Value.....	\$ 68
Pictou	"	636	"	3,569
Wallace	"	2,662	"	13,500
" (Dominion)	"	400	"	500
Amherst	"	2,723	"	12,244
Total.....	"	6,638	"	\$29,881

GRINDSTONES, ETC.

Pictou	Tons.	398	Value.....	\$4,100
<i>Messrs. A. Seaman & Co., Lower Cove. Cumberland Co.</i>				
1,680 tons Grindstones.....			Value.....	\$20,160
4,000 boxes Whetstones.....			"	4,000
				\$24,160

FIRECLAY.

McIntosh & Dewar, Stellarton, Pictou Co ...	400 tons.
Pictou.....	1½ tons (exported.)
401½ tons.	

IRON MINING.

AMOUNT MINED.

Londonderry	39,588.10 tons.
Guysborough.....	255 "
Total.....	39,843.10

AVERAGE FORCE EMPLOYED DAILY.

Belowground, Miners	49
" Laborers.....	58
" Boys	4
Aboveground, Mechanics	5
" Laborers.....	20
" Boys	3
Total.....	139

MANGANESE.

AMOUNT MINED.

Tenny Cape.....	125 tons.
Walton.....	7 "
Cheverie	17 "
Pembroke	6 "
North River	6 "
Loch Lomond	70 "
Total	231 "

AVERAGE FORCE EMPLOYED DAILY.

Men	40
Boys	6
Total.....	46

The returns of coal transported by the Intercolonial Railway were not received in time to be included in this report.

FINANCIAL STATEMENT.—GOLD.

Mines Department for Twelve Months ended December 31st, 1881.

DISTRICT.	RECEIPTS.				EXPENDITURE.				
	Rents.	Royalty.	Sites.	Totals.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Totals.
Caribou	668 00	337 08	.....	\$995 08	20 00	.....	13 12	92 50	\$125 62
Fifteen Mile Stream	934 00	69 05	.....	1003 05	56 00	69 05	.....	10 00	135 05
Gay's River	63 00	5 34	.....	68 34	32 00	.....	.....	6 00	38 00
Lawrencetown	158 00	69	.....	158 69	.....	.....	.....	.....	.....
Montagu	536 00	353 12	.....	889 12	132 00	.....	22 75	365 38	520 13
Oldham	282 00	108 89	.....	390 89	.....	.....	2 67	22 00	24 67
Ovens	8 00	.....	.....	8 00	.....	.....	.....	.....	.....
Renfrew	26 00	71 28	.....	97 28	.....	.....	4 40	22 00	26 40
Sherbrooke	56 00	975 95	.....	1031 95	.....	.....	51 80	613 32	665 12
Stormont	304 00	.....	20 00	394 00	16 00	.....	.....	.....	16 00
Tangier	555 00	182 34	.....	737 34	2 00	.....	8 19	.....	10 19
Uniacke	264 00	463 65	.....	727 65	.....	.....	10 77	138 82	149 59
Wagamatkook	6 00	.....	.....	6 00	.....	.....	.....	.....	.....
Waverley	1738 00	133 16	.....	1871 16	540 00	.....	2 38	27 50	569 88
Wine Harbor	64 00	416 43	.....	480 43	.....	.....	7 59	.....	7 59
Unproclaimed	5032 00	27 89	.....	5059 89	116 00	.....	.....	463 09	579 09
Prospecting Licenses .....	.....	.....	.....	8822 48	.....	.....	.....	.....	*341 50
	\$10684 00	3144 87	20 00	22671 35	914 00	69 05	123 67	1760 61	3208 83

*Return.

OTHER THAN GOLD.

Mines Department for Twelve Months ended December 31st, 1881.

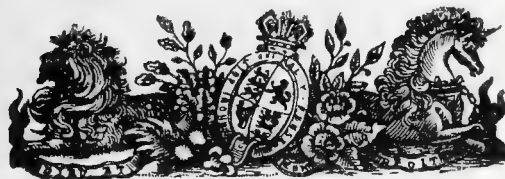
COUNTIES.	RECEIPTS.				EXPENDITURE.			
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Return Licenses to Search.	Return Licenses to Work.	Surveys.	Totals.
Annapolis	\$36 00	\$50 00	.....	\$110 00	.....	.....	\$20 00	\$20 00
Antigonish	300 00	.....	.....	300 00	\$40 00	.....	7 50	47 50
Cape Breton	720 00	475 00	\$42726 89	43921 89	20 00	\$50 00	.....	70 00
Colchester	520 00	.....	.....	520 00	100 00	.....	.....	100 00
Cumberland	560 00	150 00	118 74	828 74	20 00	50 00	6 00	76 00
Guysborough	260 00	.....	.....	260 00	200 00	.....	.....	200 00
Halifax	40 00	.....	.....	40 00	120 00	.....	.....	120 00
Hants	80 00	.....	.....	80 00	.....	.....	.....	.....
Inverness	260 00	.....	.....	260 00	40 00	.....	.....	40 00
Pictou	1020 00	75 00	30828 99	31923 99	20 00	.....	.....	20 00
Richmond	280 00	50 00	.....	330 00	20 00	.....	.....	20 00
Victoria	460 00	.....	.....	460 00	120 00	.....	.....	120 00
	4560 00	800 00	73674 62	74034 62	700 00	100 00	33 50	833 50

ABSTRACT ACCOUNT.

Receipts and Expenditures for the Twelve Months ended December 31st, 1881.

RECEIPTS.	EXPENDITURE.
Licenses to Search	Return Licenses to Search..... \$700 00
" " Work	" " Work
Royalty	Surveys
\$79,034 62	\$833 50
Rents	Return Rents
Royalty	" Royalty
Mill Sites.....	Royalty Commission
Prospecting Licenses	Salaries and Surveys.....
\$22,671 35	Return Prospecting Licenses.....
	\$3208 83
	General Expenses.....
	Postage
	Stationery and Printing
\$101,705 97	\$5907 30
	\$9949 63

REPORT
OF THE
DEPARTMENT OF MINES
NOVA SCOTIA,
FOR THE YEAR 1882.



HALIFAX, N. S.:
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.
1883.

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DEPARTMENT OF MINES.

REPORT. FOR THE YEAR 1882.

*To His Honor the Honorable ADAMS GEORGE ARCHIBALD, C. M. G.,
Lieut-Governor of the Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR :—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled by him from official and other returns made to the Department of Mines, during the year 1882.

ALBERT GAYTON,
Commissioner of Public Works and Mines..

HALIFAX, February 8, 1883.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, JR., A.M., F.G.S., M.R.S.C.

INSPECTOR OF MINES,

(*Member of the North of England Institute of Mining Engineers.*)

OFFICE OF INSPECTOR OF MINES, Feb. 5th, 1883.

THE HON. ALBERT GAYTON, M.P.P., M.E.C.,

Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following Report on the Mines of the Province, carried on during the past year.

In addition to a detailed notice of the operations at each Mine, and the usual statistical tables, I submit a summary of the amount of minerals exported, not paying Royalty to your honorable Government.

The following summary shows so far as I have been able to learn, the extent of the mineral production of Nova Scotia during the year 1882, compared with that of the previous year.

		1881.	1882.
Gold.....	Ounces....	10,756.....	14,107
Iron Ore.....	Tons	39,843.....	42,135
Manganese Ore...	"	231.....	205
*Coal raised.....	"	1,124,270.....	1,365,811
†Gypsum.....	"	107,133.....	133,426
†Building stone....	"	6,638.....	4,357
†Barytes.....	"	40.....	
Coke Made.....	"	27,871.....	26,731
Fireclay.....	"	401.....	
Grindstones, etc..	"	1,680.....	2,450

Through the kindness of the Collectors of Customs at the ports specified, I am enabled to give further details under this head at the end of the Report.

* Ton of 2,240 lbs.

† Quantities shipped. Amounts used in Nova Scotia unknown.

COAL TRADE.

The total sales for the year 1882 amounted to 1,250,179 tons, against 1,035,014 tons in 1881, being an increase of 215,165 tons.

The following are the most noticeable points in the coal trade:

The home sales were 458,952 tons, against 268,628 tons in 1881. The coal sent to the Province of Quebec amounted to 383,031 tons, an increase of 114,403 tons over the quantity sent in the year 1881.

The sales to New Brunswick show an increase of 30,091 tons.

The sales to Newfoundland increased from 62,174 tons in 1881 to 79,732 tons, an increase for the past year of 17,558 tons.

The sales to Prince Edward's Island show a slight increase.

The sales to the United States fell off 14,426 tons.

The sales to other points present little to be noticed.

CUMBERLAND COUNTY.

The total sales of this County amounted to 218,349 tons, against 171,149 tons in 1881. The sales to Quebec were 58,561 tons, against 35,548 tons in the year 1881. The sales to New Brunswick showed an increase of 23,170 tons.

COLLIERIES.

CHIGNECTO.—During the past year this mine was put in complete working order. The levels have been extended east and west, and counter balances driven, and the regular extraction of coal commenced. A furnace 8 feet 6 inches wide, with an arch of the same radius, was built at the bottom of the old shaft. The total height of the heated column, including a stack of 50 feet, is 150 feet. Twenty workmen's houses have been erected, and the bankhead screens, etc., have been roofed over. The bankhead is lighted by three electric lights, which have been found to work very satisfactorily, and to greatly facilitate screening, etc., at night. The branch railway has been straightened and laid with heavier rails, and a locomotive substituted for the horses formerly used in taking the coal to the Intercolonial Railway. The output was 12,504 tons.

JOGGINS.—At this mine the operations have been on an enlarged scale during the past year. The workings have been continued in the old slope on the system in force during the past few years. At the face of the old workings a new slope has been sunk and equipped. It is about a mile and three quarters from the shore, and it is propos-

ed to connect it with the wharf by means of an endless rope. The completion of the new winning will enable the output of this colliery to be very materially increased during the year 1883. The output was 20,178 tons against 18,880 tons in 1882.

MINUDIE.—During the year preparations have been made by the Minudie Coal Mining Co. for effective operations, by sinking a slope 500 feet long on their four and a half feet seam. The necessary engines, houses, tenements, etc., have been put up, and a road is being prepared to a wharf on the river.

SCOTIA.—A few tons were extracted for land sale, and a new slope started to the west of the old one. Some prospecting was done on the property with a view of finding other seams.

SPRINGHILL.—The operations at this colliery have been continued with customary vigor. The extraction of pillars in the east section of the north seam has been finished. The other workings have been regularly carried on. The tunnel to the overlying new seam has been completed, and is now connected with the winnings in this seam made through the slope sunk during the summer. Another borehole has been put down to furnish a more constant supply of water for the boilers. It is proposed to erect a mechanical ventilator during the approaching summer. The output was 200,353 tons, against 160,485 tons in 1881.

PICTOU COUNTY.

The total sales of this County during the year 1882 were 446,137 tons. The home sales show an increase of 42,817 tons. The sales to Quebec were increased to a similar extent. The sales to other points remain unchanged. The usual amounts of coke were made.

ACADIA.—During the past year the extraction of pillars in the working lift has been continued, and the slope has been extended for a new lift. The coal continues to maintain its uniform quality. The new Guibal fan, referred to in my last report, has been found to work very satisfactorily. The pillar work is carried on with safety lamps, and during the summer a miner was fined for injuring his lamp.

The economical method of burning the culm for steam purposes, practiced at this mine, is still continued satisfactorily, and merits the attention of manufacturers through the Province. The output of the past year was 105,569 tons, against 87,582 tons in 1881.

ALBION MINES.—The operations in the third seam have been continued during the past year, and the colliery is now in full operation.

The Dip winnings from the McGregor shaft have been continued, and the east levels turned away to allow of a back balance. The heapstead in the McGregor pit has been roofed, and it is proposed also to roof in the boilers, heater, etc., at this pit.

The manufacture of Coke has been steadily continued during the year, and the returns show a yield of 12,512 tons. A new range of 50 ovens is being erected a few yards from the McGregor pit, and are arranged for a ready and economical system of supplying the slack and loading the coke. The output of the mine was 141,090 tons, against 59,316 tons in 1881.

INTERCOLONIAL.—The operations of the preceding year have been steadily continued. The extraction of pillars in the western face of the working lift has been commenced. The levels and bords going east have been considerably advanced. The slopes are being sunk for a new lift. In the No. 4 slope the bords in the upper workings have been advanced and the slope deepened.

The new shaft to the second seam struck the coal at 218 feet. An air shaft has been started to the rise, and drivages are being made to connect them. The seam will give about 8 feet of coal, similar in quality to that now being mined by the Company in the Acadia seam. This new winning will enable the Company to greatly increase their output during the coming season. The output of the colliery was 150,486 tons, against 135,084 tons in 1881.

VALE.—During the past year the workings in the lower lift have been extended, and the pillar working has been continued satisfactorily. The new lift has been won out, and the bords started. The coal appears to maintain its quality in the new lift. A large Knowles pump has been put down with a 6 inch pipe to raise the water from the lower level, a distance of 1,800 feet, or a vertical lift of 875 feet.

A new boiler has been added to those supplying steam to the winding engine and pumps. The Guibal fan has been started and is found to work very satisfactorily. The new winding engines are being erected, and upon their completion the colliery will be very well equipped. The output was 92,808 tons against 90,215 tons in 1881.

CAPE BRETON COUNTY.

The sales of coal from this County amounted to 585,568 tons against 516,852 tons in 1881.

The Home sales were 169,327 tons against 136,922 tons during the preceding year, an increase of 32,405 tons. The sales to Quebec show an increase of 49,249 tons over those of the preceding year. The sales to the United States show a decrease of 19,628 tons. The sales to other points show slight increases.

COLLIERIES.

SYDNEY.—During the past year the workings have been continued in a systematic manner. The changes in the shaft arrangements referred to in my last report have been carried out and have resulted in improving the ventilation. The force pump at the Queen shaft has

been completed and is now at work. An ingenious arrangement of the empty road at the south side of the pit bottom has done away with the bottom horse. The experiment of using salt for keeping down the dust in the levels and engine planes was tried by Mr. Brown with satisfactory results. At a comparatively small cost the roads have been made much healthier for men and horses, and the cost of axle grease is materially lessened. The underground engines have been fitted with double brakes. Five blocks of miners' houses have been built. The output was 156,758 tons against 161,577 tons in 1881.

LOW POINT.—During the past summer the General Mining Association, having acquired the property formerly known as the Victoria, have repaired the railway, rebuilt the pier, and prepared for opening a large mine at Low Point. The seams at the point selected for the opening lie at a lighter angle than at the Victoria mine, and are said to be of excellent quality.

LINGAN.—The returns for the first quarter of 1881 show a production of 2,399 tons. Since that date operations have been suspended.

RESERVE.—At this mine work has been pushed in both slopes. Ten bords were worked out of the French slope, and the west slope bords were continued. Some necessary repairs were made to houses, etc. It is proposed to sink a shaft to the dip to win the Reserve and Emery seams. The output of the mine was 93,828 tons, against 76,727 tons in 1881.

INTERNATIONAL.—The work of the year has been an extension of the operations recorded last year. A new dip road is being driven near the face of the east dip bords to shorten the railway haulage in the dips. On the surface the bankhead has been raised, and will be roofed in. A house has been built for the surface foreman, and other repairs carried out. The output was 109,286 tons, against 76,860 tons in the preceding year.

LITTLE GLACE BAY.—At this Colliery the work has been carried on more briskly than has been the case for some years. The levels and bords on both sides of the pit have been continued. The output was 70,186 tons, against 35,012 tons in 1881.

CALEDONIA.—During the past year the bords to the rise of the water level were worked. The west level was driven to the barrier, and the bord workings continued from it. The extraction of pillars was continued on both sides of the pit. The heapstead was raised four feet. The output was 59,893 tons, against 43,426 tons during the preceding year.

ONTARIO.—At this Mine the slope has been extended 300 feet, and levels have been turned away to the east and west. A small furnace has been erected. A new winding engine has been built and repairs made to the houses. The output has been 24,541 tons, against 15,117 tons in 1881.

BLOCK HOUSE.—The extraction of pillars is continued at this Colliery. I am informed that arrangements are being made to sink to the underlying eight feet seam. The output was 61,753 tons, against 61,108 tons in 1881.

GOWRIE.—Operations have been continued on the upper level, and some pillars have been drawn on the lower level. The new shaft has been put in operation and the fittings, machinery, etc., appear to be of excellent design and workmanship. The output was 62,256 tons, against 64,180 tons in the preceding year.

MISCELLANEOUS.

Operations at Little River, Richmond Co., were stopped in the spring. No regular work was carried on at Broad Cove and Campbellton.

Discoveries of coal were reported from Leicester, Cumberland Co.

Hantsport, Hants Co., and East Bay, Cape Breton Co. Near West River Station, on the Pictou Railway, a seam of coal was said to show eighteen inches of good coal, associated with thirty inches of mixed coal and shale.

In Onslow, Colchester Co., prospecting was carried during the summer, and resulted in the discovery of several seams, one of which was said to be 12 feet thick.

GOLD MINING.

The anticipations of an increased yield of gold during the past year, as referred to in my last report, have been well realized. The total yield of gold during the year was 14,107 oz. 3 dwts. 20 grns., against 10,756 oz. 13 dwts. 2 grns. during the preceding year. This is the largest yield since the year 1871, except during 1877 when the production rose to 16,882 ounces.

The returns from the various districts show the customary annual fluctuations. Sherbrook makes a return of 6,251 tons of quartz crushed with an average yield per ton of 8 dwts. 3 grns. This low average is due to the trials being made on a large scale, of working wide beds of low grade ores. Similar work has been tried at Uniacke, so far I understand with encouraging results. Should these experiments, which demand strict economy in mining and skilful milling, succeed, the future of gold mining in this Province will be settled on a new basis, more permanent if not as alluring as the rich lodes which occasionally reward the prospector's toil.

The work of opening up new districts has been successfully carried on at Chezzetcook, and Salmon River, and during the approaching season these localities will receive still more attention.

DISTRICTS.

CARRIBOU.—During the past year but little work was done at the old Jennings Diggings.

At Moose River operations were confined principally to the property of the Moose River Gold Mining Company. Under the superintendence of Mr. C. A. Scott the Foster mill was united with the new mill, giving twenty stamps driven by steam, and furnished with breaker, feeding bins, and Frue Vanner for treating the tailings. Two shafts have been sunk on the North Sutherland lode to a depth of 150 and 200 feet and regular stoping carried on. Shafts have also been sunk on the Comstock and other lodes. It is proposed to crosscut the measures to the south of the Sutherland lode by means of a tunnel at a depth of 100 feet. A Clayton air compressor feeds four Ingersoll drills, which have been found to work very satisfactorily, and are stated to effect a considerable saving as compared with hand drills in the slopes. The arrangements for pumping and hoisting are systematically and well arranged.

Mr. Touquoy did some work on the western extension of the Sutherland lode, and in Carribou.

FIFTEEN MILE STREAM.—This district has received much attention this year, and promises well. The Hall-Anderson Gold Mining Company have erected a mill, houses, etc., and have worked the Serpent and Orion lodes, James Hudson, Esq., has traced several of the southern lodes from the Hall-Anderson area into his, and finds that they promise favourably; during the approaching season he proposes tracing the Serpent lode.

This vein has been traced to the west across the property of Mr. J. S. Mackay, of New Glasgow. Mr. Grant and the Boston and Halifax Company have worked on their areas.

MONTAGU.—The Rose Gold Mining Company have ceased working. Work was carried on during most of the year on the Symonds and Kaye property. Prospecting was done by Mr. Stuart on the Lawson and other properties. Beyond this but little work was carried on. The Concentrator, erected by Mr. Hale, was burnt in the fall.

WAVERLY.—Work was done by Mr. McClure on his areas, and at one or two other points. At the close of the year Mr. Huff found on area 250 a seven inch lead, believed to be the source of some rich boulders long known at this point. The district, however, still continues in a depressed state. The treatment of the tailings has been carried on during the past year, and it is to be hoped that the subject will more generally engage the attention of our miners.

OLDHAM.—Comparatively little work has been performed here during the year. Mr. Baker opened and worked a large cross country vein, running on a general north and south course, and dipping to the west. The Messrs. Donaldson worked for some time on their areas to the south of the Baker Mine. A little tribute work was performed at one or two points. Mr. Barnstead is stated to have found the continuation of the Britannia lode.

RENFREW.—Beyond the operations of Dr. Rae, little work has been done here. Operations have been carried on by him in the Hard, Brook, and Bain lodes. During the summer repairs were made on the Ophir Mill.

SHERBROOK.—The returns from this district are 2,542 oz. 17 dwts. 14 grns., against 2,580 oz. in the year 1881.

On the Wellington a little work was done to test some new lodes. Tribute work was performed on the Hadyn and Woodville areas. In the fall a promising lode was found on the Dominion area.

In the Palmerston property the belt was exclusively worked. A tramway has been constructed to the mill, and the problem of successfully working Nova Scotia low grade ores appears to be settled in this district. A consolidation of the Palmerston and several adjoining properties has been effected, under the name of the Pactolus Gold Mining Company, and preparations are being made for more extended operations.

The Cumminger property at Cochran's Hill was transferred to the Boston and Halifax Gold Mining Company, who have continued and extended the former workings.

STORMONT.—The Gallagher Gold Mining Company are now in regular working order. A shaft has been sunk cutting the Mulgrave lode at 360 feet. At 260 feet a cross cut has been made to the Gallagher lode. Levels have been driven and stoping carried on systematically. Trial shafts on a lode, lying south of the Mulgrave lode, 6 to 10 inches thick, with 5 feet of slate having suckers of quartz, have given very satisfactory results.

The new mill is driven by a 12 inch cylinder, and has 10 stamps of 750 lbs. each and is of an excellent design. Two Burleigh drills are used at this mine, and were found to give satisfactory results in sinking and driving.

TANGIER.—At Strawberry Hill Mr. Townshend continued his operations. The mill has been extensively refitted, and work has been done on the Forrest and other lodes, near the Mooseland Road.

The Satemo Company have continued their operations in the Nugget and Kent lode. The operations of the Pittsburg Gold Mining Company were stopped during the summer, and it is proposed to continue the workings of the property in future on the tribute system.

The Kent Company have worked the Kent and Nigger lodes and crush at the Pittsburg Mill. It has been proposed to change the system of carrying the water through a long flume, at present adopted for driving the mill, by building a dam across the River. The returns from this district are increasing again, and it is to be hoped that they will lead to its resuming its former position as a good paying district.

UNIACKE.—Mr. Prince worked the Nugget lode to the east of the ground where it was operated by Mr. Blois, and toward the close of the year resumed operations on the slate belt west of the mill. On the Montreal property the large slate belt was reopened and extensively worked. Mr. Davidson sunk on a 12 inch lode to a depth of 200 feet and carried stopes east and west. The Galena lode was worked by Mr. Lee. At several other points a little tribute work was done.

WINE HARBOR.—Operations at the Henry Mines were suspended in the spring, since which date there has been no work of any importance done here.

OTHER DISTRICTS.—At Lochaber between Sheet Harbor and Fifteen mile stream the Lochaber Gold Mining Company have found a belt of slate and quartz seven feet wide showing very well. Numerous good specimens have been found, and about 40 tons of promising quartz has been mined for a trial crushing.

At Ecum Secum, and Beaver Dam a little prospecting has been done. At Killag Mr. Stuart trenched East of the River and exposed sixteen lodes some of them showing gold. The MacKinlay Company found some promising lodes.

At Salmon River Messrs. Ross and Hattie have continued to develop their four inch lode, and have erected the mill formerly in operation at Dun Cove.

The Archibald property, after a suspension of several months owing to litigation, is again being worked vigorously. The lode maintains its richness and size, and keeps a thirty stamp mill running steadily.

At Chezetcook, the Oxford Gold Mining Company have started a very complete milling plant, and have erected the necessary stores and dwelling houses. Work has been pushed vigorously, and the district has been well established as a gold producer by their systematic development. Mr. Stather, Mr. McKay, and the Messrs. Vaughan have all made important discoveries to the north and west of the Oxford property. Additional prospecting was done by Dr. Cogswell, and by Messrs. Weston, McLeod, and others.

COPPER.

Discoveries of copper ore were reported from Malagash, Digby, and Dalhousie, and some prospecting was done at Seal Island, Bras d'Or, and St. Ann's, Cape Breton. At Coxheath, near Sydney, the Coxheath Copper Mining Company have sunk two shafts 1100 ft. apart. These shafts have been sunk about 200 feet, and levels and cross cuts driven. Some bodies of very rich ore were cut; nearly all the ore bed, which is about 25 feet wide, shows ore. The owners have erected an agent's and other houses, and expect to begin the shipment of ore in the spring, as soon as their machinery is set up.

SILVER, LEAD, &c.

During the past year, discoveries of silver-bearing ore have been reported from Cheticamp and St. Ann's in Cape Breton, and from Canaan and Hopewell in Nova Scotia. A little further prospecting has been done at Arichat, and Pleasant Bay in Cape Breton.

At Smithfield, in Colchester County, work has been done by Mr. H. Clarke to prove a large body of sulphides of galena and iron, in limestone, presumably of Carboniferous age. Assays are stated to show varied percentages of silver up to 100 ounces to the ton of lead, and gold up to 5 dwts. to the ton of ore. The property has attracted a good deal of attention, and it is hoped that efficient steps will be taken to develop it fully. Similar ores were found in the same district by Mr. Pitblado.

IRON MINING.

The mines of the Steel Company of Canada were kept in full operation during the summer. The No. 7 level has opened up a valuable range of ore in the west mine. In the Cumberland and in the Cooks Brook mine a small extraction of ore was made. Some ore was also taken from the north vein.

A compact red hematite of good quality was found near the village of Maitland, and at several points further west.

Specular iron ore is reported to have been found at Roman Valley, Guysborough. The Crane Iron Company, of Philadelphia, have taken out 3,000 tons of ore from their mine at Salmon River Lakes, Guysboro. At present the best means of transporting the ore to a good shipping place in Chebucto Bay is under consideration and mining has been stopped. The ore is said to be of good quality and the deposit appears to be of unusual size. The work so far as carried has proved the lead to be from 25 to 35 feet wide, and that these dimensions hold good to a considerable depth.

MANGANESE, Etc.

Mr. Mosely has continued shipping ore from his Loch Lomond mine, which establishes a new mining industry in Cape Breton. He intends erecting an engine for pumping and other purposes. The amount mined was 59 tons.

Messrs. R. J. & J. W. Stephens worked during the summer at Cheverie, and took out 21 tons of ore.

Mr. R. J. Stephens also tested some property at Walton, and took out 6 tons of ore.

Mr. J. W. Stephens continued mining at Tenny Cape, and shipped 120 tons of first-class ore. Prospecting was continued at the Manganese deposits, near the Valley Station of the Pictou Road.

Small quantities of antimony ore were reported as being found at Meagher's Grant, Musquodoboit. The oil borings in Cape Breton, referred to in previous reports, have been suspended. Arrangements are being made to put down some bore holes, near Pictou, for the purpose of testing a tract of country which yields good surface indications of oil.

A deposit of mica has been tested during the past summer at McNiel's Harbor, near Cape North. The owners report that the mine promises to yield a large supply of mica of good size and color.

The shipments of gypsum from Windsor and the vicinity are the largest recorded for some years, and it is gratifying to see an extension of this trade, as it is one capable of being very largely increased.

The usual amounts of limestone have been quarried for the Londonderry furnaces, and the yearly use of this article for lime making has been maintained, Mr. McLaughlin's out-put being about 7000 barrels.

ACCIDENTS.

During the year 1882 the following fatal accidents occurred :

1. March 11.—J. McKinnon, miner, Coxheath Copper Mine, killed by fall of stone in sinking shaft.
2. May 12.—Angus McIsaac—miner—Londonderry Iron Mines, —while passing through eye of shaft was killed by balance cage.
3. August 8.—Alexander McEachern, chain runner, Intercolonial Colliery, was killed by rake of full tubs, starting from the bottom of the slope.
4. August 18.—J. McGrath, miner, Goldenville, killed by fall of stone from a scaffold he was taking down.
5. September 28.—James Shanahan, driver, Little Glace Bay Colliery, killed by fall of stone from roof.

Among the non-fatal accidents, one occurred at the mine of the Pittsburgh Gold Mining Company, Tangier: James Conrod was engaged in loading a hole with a cartridge of frozen gelatine dynamite with a wooden rod, when it exploded, and severely injured him and his partner, Henry Cluttenburg, Jr., about the face.

John Jesse, a collier at the Sydney Mines, was burned by a spark from his lamp igniting some powder he was pouring out. At the Chignecto mine a collier was injured by the premature explosion of a shot he was in the act of firing. A miner named David Slack had his hand severely injured at the Londonderry mines by the explosion of three dynamite caps.

At the Albion Mines, a roadsman, named Daniel Gillis, had his hands burned by a small accumulation of gas in a head in the mine bord.

Falls of roof and coal caused several fractures of limbs.

At the gold mines of Mr. B. M. Davidson, at Mount Uniacke, John McGaskill fell about 60 feet in the shaft, and sustained very serious injuries.

A trapper at the Albion mines named Robert Harvey left his post, and was injured at a counter balance.

Last year a fatal accident occurred to a man while riding in a slope, this year a man was injured at the Chignecto Mines in a similar manner.

MISCELLANEOUS.

The Board of Examiners appointed under Section 10, Chap. 5, Acts of 1881, have held the first examination of men desiring to obtain certificates of competency as Underground Managers and Overmen of coal mines.

Certificates of competency as underground managers were obtained by :

Thomas Scott,	Springhill Mines.
Henry Swift,	" "
James Baird,	Chignecto "
Thomas Routledge,	Reserve "
Hugh Campbell	Gowrie "

Certificates of competency as underground overmen were obtained by :

Alexander McDonald,	Albion Mines.
James Rogers,	" "
George Wilson,	Chignecto "

A number of certificates have been granted to men who have held the above positions for five years, and whose qualifications by actual service are sufficiently ascertained. As these certificates are not of the same value as those gained by men successfully passing the examinations, it is expected that a large proportion of those holding them will shortly present themselves for examination.

While the results of the examinations showed in many instances careful preparation and good practical knowledge, it was evident in all cases that a correct understanding of the principles of ærostatics, chemistry, &c., were wanting, and necessarily so. It would be highly desirable that some means should be provided in the principal mining centres to afford to the mining class an opportunity of acquiring these fundamental principles.

At the present day every occupation dealing with the world and its numberless products, calls in all the aid that the most advanced discoveries in science can afford or promise. This is especially true of the miner, who can win the treasures of the rocks only by availing himself of every fresh discovery of the laws governing the formation and changes of the mineral he seeks, and the material he employs to carry out his plans. I have referred fully to this in a paper on the subject of the training of Mining Engineers published in the transactions of the Nova Scotia Institute of Science.

In the United States the subject has received attention. In Ohio it was proposed that all applicants should pass an examination for a certificate of competency, except those who had been " mining bosses " for two years previously to the passage of the bill. The act was not passed, but will be reintroduced this year.

Circulars were sent to coal operators in Pennsylvania by the Inspectors to ask their opinion as to the necessity of a system of certificated " mine bosses." The majority of the answers are favorable to its adoption, but the subject does not appear to be considered of pressing importance.

The law prescribes that after the first day of January, 1884, the positions of underground manager and of overman in our coal mines must be filled by certificated men; the agents of the various mines will therefore be obliged during the present year to see that their staff is composed of duly qualified men. Those requiring such certificates must also see that they qualify themselves, as delay may cause them much inconvenience and loss of time.

FRENCH COMMISSION.—The report of the French fire damp Commission, so far as it has been made public, promises to be a valuable contribution to mining literature. The products of the combustion of fire damp were found by the Commission to vary according to the proportion of air mixed with it. When there is less than 9.5 per cent of gas in the air, carbonic acid and water were formed; beyond that limit, however, some carbonic oxide is also formed, and some marsh gas and hydrogen remain unconsumed.

According to the researches of the Commission, fire damp is inflammable when present in the air to the extent of 5.8 per cent; and the limit of inflammability is reached again at 16.5 per cent. The temperature of its ignition is about 740° Celsius, or 1364° Fah., but at this temperature the time of contact must be extended to several seconds before ignition. Practically this makes the point of ignition a white heat.

It is admitted by the Commission that variations in barometric pressure exert but little influence on the exudation of fire damp from the faces of solid coal. It is, however, believed that rapid falls of the barometer may make the gas in old works, goaves, etc., enter the galleries. They therefore attach but little importance to the variations of the atmospheric pressure, as influencing conditions favourable to the accumulation in mines of unusual quantities of gas.

Several anemometers were tested by the Commission and the Bourdon was found the most reliable. The Mueseler lamp was considered the best of those in common use. Electric lighting does not appear to the Commission to be adaptable to the requirements of collieries. They confess that they have been unable to suggest any remedy for the danger of shot firing in fiery mines, and admit that explosions are not inevitably preventable, but that every attention should be paid to those circumstances of increased depth and greater activity of extraction which more and more characterise coal mining.

There can be little doubt that naked lights and the use of gunpowder are directly responsible for the great majority of fatal explosions. It is found that, wherever in fiery districts the use of powder and open lights has been discontinued, the loss of life from ignition of gas is very materially diminished.

In this connection the following table is of interest. It is from the report of the Belgian Commission, and shows the explosions that have occurred in Belgian mines from 1821 to 1879, divided as follows:—

CAUSES.	1821-50	1851-79	1821-79
Naked lights.....	49.....	29.....	78
Opening of lamps.....	48.....	33.....	81
Rapid movement of lamps.	5.....	5.....	10
“ currents of air.....	7.....	2.....	9
Defective lamps.....	17.....	32.....	49
Spontaneous combustion	1.....	1.....	2
Ventilating furnace.....	18.....	1.....	19
Fires at bank.....	4.....	4.....	8
Unknown.....	21.....	15.....	36
Gunpowder	47.....	73.....	120
	217	195	412

From this it will be seen that not only is gunpowder credited with causing the greatest number of explosions, but that the proportions are increasing.

UNDERGROUND FIRES.—It has been customary at some of our mines to leave the smalls, from holing and riddling underground, with the view of avoiding the expense of drawing and dumping them. The practice is suspected of having been the cause of fire in one or two instances in this Province. It is well known that such accumulations are capable of igniting after a long lapse of time, and those who have been following this custom should see that the prevention of a temporary inconvenience does not lead to serious trouble and loss.

The following notice bears directly on this point. The Seghill Colliery is one of the oldest works in the celebrated Hartley Steam Coal, having been sunk in the year 1822, and won out in the years following.

It was the custom in those days to leave all the small coals, got in holing, underground, and it now appears that spontaneous combustion has taken place, and those small coals are burning, and the shale above the seam has also been ignited, and has been burnt for a considerable height above the seam. Great exertions are being made to extinguish the fire by pouring on water, and also by cutting out the debris from the parts where the fire has been extinguished. It is expected that the fire will be subdued, and when that is accomplished the district where it occurred will be walled off by means of bricks and cement.

THE COMPOSITION OF THE RETURN AIR OF COLLIERIES.—The following summary of Dr. Winkler's analyses, made for the Commission engaged in the revision of the rules for the safety of mines in Saxony, is of interest. It includes analyses of the return air in gas free and fiery mines, three pits being selected as types in each of the three coal mining districts, and samples being taken on working days and on Sundays.

The constituents determined by analyses were:—Dust, water vapor, oxygen, nitrogen, carbonic acid and fire damp.

The dust was separated by filtering the air through spun glass, but

in no case was an appreciable weight obtained from ten litres. If a weight of even one milligram had been obtained the whole amount of dust carried in the air could not exceed 43 kilograms in twenty-four hours, which shows that the air in these mines is practically free from coal dust. This is perhaps due to the circumstance that experiment showed that the air was practically at its point of maximum saturation with water.

None of the methods hitherto in use were found to be sufficiently delicate for the determination of small quantities of marsh-gas, and therefore a new plan was adopted, of passing from 5 to 8 litres of air which had been previously freed from every trace of carbonic acid over red-hot oxide of copper, and collecting the carbonic acid, formed by the combustion, in baryta-water. The volume of carbonic acid found corresponds to an equal volume of marsh-gas burnt. Nitrogen was calculated by difference in the ordinary way.

The results of the analyses, which are given in detail, show a considerable variation in the composition of the air, and more particularly in the proportion of carbonic acid. As the amount of this constituent is only slightly variable in atmospheric air, the variation is due to the products of respiration and the burning of lamps, but more particularly to gaseous exhalations from the coal and joints in the rock. That the latter is the more important source, is evidenced by the slight difference in the composition of the air on Sundays and working-days, the amount of carbonic acid being, as a rule, only slightly in excess on the latter. Marsh-gas appears to be invariably present, the amount being sometimes greater on working-days than on Sundays, and sometimes the reverse. The variation in these constituents is as follows, in volume, per cent :

COLLIERIES AND DISTRICTS.	MARSH-GAS.		CARBONIC ACID.		OXYGEN.	
	Week-day.	Sunday.	Week-day.	Sunday.	Week-day.	Sunday.
Lugau, Chemnitz.....	0·108	0·092	0·483	0·448	17·751	17·693
Bockwa-Hohndorf, Chemnitz....	0·156	0·111	0·146	0·143	18·613	18·652
Deutschland, ".....	0·138	0·115	0·122	0·117	18·079	17·872
Brueckenberg, Zwickau.....	0·256	0·124	1·020	0·380	17·958	18·806
Oberhondorf, ".....	0·069	0·054	0·345	0·285	18·536	18·667
Von Arnim's, ".....	0·018	0·025	1·076	0·952	18·641	18·461
Zaukeroda, Dresden.....	0·021	0·017	0·432	0·539	19·170	19·690
Von Burgk's, ".....	0·125	0·146	0·281	0·222	18·611	18·828
Hanichen, ".....	0·041	0·048	2·717	2·662	18·432	18·526

COLLIERIES AND DISTRICTS.	WATER VAPOR.		NITROGEN.		VOLUME OF UP-CAST CUB. MET. P. SECOND.	
	Week-day.	Sunday.	Week-day.	Sunday.	Week-day.	Sunday.
Lugau.....	3·475	3·446	78·183	78·320	4·028	4·236
Bockwa-Hohndorf	4·190	4·187	76·894	76·907	7·732	6·043
Deutschland.....	3·384	3·331	78·277	78·565	3·162	2·882
Brueckenberg.....	3·422	3·425	77·345	77·265	4·529	4·233
Oberhohndorf.....	3·195	2·810	77·835	78·184	3·130	3·238
Von Arnim's.....	2·282	2·745	77·984	77·958	9·640	10·099
Zaukeroda	2·888	2·525	77·489	77·228	3·566	3·049
Von Burgk's.....	3·066	2·948	77·917	77·856	6·558	7·290
Hanichen	3·193	3·057	75·617	75·707	4·515	6·280

The variation in the proportion of nitrogen to oxygen is not only affected by the consumption of the latter by miners and their lamps, but there also is an actual increase in the former from the gas given out by the coal. It was not found possible to determine this, as that would have required elaborate measurements and analyses of the intake air, which, under the conditions of the investigation, were impossible. An attempt has, however, been made to determine the actual amount of gas given off by the coal in twenty-four hours, by assuming the composition of the in-take air, the result being given in the following table, all the figures being given in cubic meters, equal each to 35 cubic feet:

COLLIERIES.		Volume down-cast.	Volume up-cast.	GIVEN OFF BY COAL.				
				Nitrogen.	Carbonic acid.	Marsh-gas.	Water-vapor.	Total.
Lugau,	Week-day..	296,744	347,299	39,047	1,559	372	9,557	50,555
"	Sunday....	311,690	365,990	42,454	1,514	333	9,994	54,300
Bockwa-Hohndorf,	W...	598,519	668,044	44,781	734	1,043	22,967	69,525
"	S...	468,756	522,115	34,299	558	580	17,922	53,359
Deutschland,	W..	227,532	273,053	37,578	236	378	7,329	45,521
"	S...	209,278	249,005	32,701	204	286	6,586	39,727
Brueckenberg,	W..	338,087	391,136	37,653	3,850	1,000	10,546	53,049
"	S...	323,441	365,731	30,790	1,255	454	9,791	42,290
Oberhohndorf,	W..	241,541	270,432	21,258	836	186	6,611	28,891
"	S...	252,368	279,763	21,797	696	151	5,751	28,395
Von Arnim's,	W..	730,330	810,864	61,059	8,084	123	12,268	80,534
"	S...	557,492	685,522	68,818	7,425	192	16,595	93,030
Zaukeroda,	W..	284,293	308,102	16,018	1,216	64	6,511	23,809
"	S...	248,787	267,610	13,759	1,340	47	4,677	19,823
Von Burgk's,	W..	495,891	566,610	55,418	1,387	709	13,206	70,720
"	S..	556,650	629,856	57,228	1,165	918	13,895	73,200
Hanichen,	W..	346,104	390,096	23,827	10,458	160	9,549	43,996
"	S...	483,818	542,592	31,722	14,249	260	12,543	58,774

From this, it appears that the total increase in volume of the return over the down-cast current, when reduced to the same temperature and pressure, varies from 7·4 to 16·6 per cent in extreme cases. In order to convey to the reader some idea of the quantities thus escaping from the coal, Dr. Winkler has calculated the carbonic acid

as equivalent to coal containing 70 per cent of carbon, and he finds that the weight of carbonic acid given off by the coal is equivalent to from 400 to 17,750 pounds of coal; and that of marsh-gas, from 108 to 1770 pounds, in twenty-four hours.

Dr. Winkler, in conclusion, points out that these figures refer only to a particular condition of things, the observations having all been made during the month of August, 1881; and to get at the real variations in the composition of the air, it would be necessary to continue them over a longer period, say an entire working year. He considers, however, that such a series of observation would be, perhaps, the cheapest, and probably the shortest method of solving questions of the highest interest for the well-being of coal-miners.

The consideration of this point leads naturally to the use of gunpowder in mines giving off gas. All appear to agree that a line defining the use or disuse of gunpowder cannot be drawn in an arbitrary manner. The attention which is paid to every new invention which presents the slightest claim to supercede gunpowder, shows that the conviction is wide spread that the days of gunpowder in coal mines will shortly be numbered. The interests of the safety of workmen would justify its disuse in every mine known to give off gas, even in small quantities. The figures given above show that even in countries where the proper working of mines has received a most enlightened and careful consideration, it originates the most terrible catastrophes.

Whenever gas appears in a mine in tangible quantities, no assurance can be given that the amount will not increase, rapidly or slowly, or that blowers will not be met capable, on ignition, of baffling the efforts of miners to extinguish them.

Expectations were raised that the use of a "wad" of water on top of the ordinary charge of gunpowder would prevent any dangerous flame, while allowing the powder to exert its strength on the coal. Practical tests, however, appear to show that it is little safer than gunpowder used alone.

The system of "blasting" with lime cartridges consists in placing in the shot hole an iron tube having on one side a perforated groove. A cartridge of caustic lime is introduced into the tube and slightly rammed, after which a force pump is attached to the end of the tube and a little water forced in. The expansion of the lime and the heated vapour separates the coal without the danger of ignition of gas.

Practical trials appear to show that in a firm coal, unbroken by lypes, etc., this system is cheaper than wedging. Detailed experiments and estimates are still wanted to show if it can rival gunpowder in bords, with respect to certainty and cheapness. Should these show that any approach can be made to an equivalence in expense, there can be no doubt that the important element of increased safety will secure its application in all seams showing gas in quantities liable to cause damage.

WIRE ROPES.

The Government Mine Inspection for the Dortmund district have issued the following rules for calculating the strength of winding ropes:—1. For iron wire ropes; 6 is assumed as the factor of safety. The weight to be raised (in kilogrammes) is equal to 7·31 times the square of the diameter of a wire (in millimetres) multiplied by the number of wires. Where pounds and inches are used in place of the kilogrammes and millimetres the factor, 7·31, must be replaced by 10,500. Where the diameter of the wires cannot be accurately measured, the following rule can be used to obtain it:—The diameter of the wire multiplied by the square root of the number of wires in the rope is equal to 6·6 times the diameter of the rope. 2. For ropes manufactured from alooe fibres. The weight to be raised (in killogrammes) is equal to 110 times the sectional area of the rope (in square centimeteres). For pound and inch units the factor, 110, becomes 1576. In place of measurement for the area which is difficult accurately to attain, the following rule may be used as a check: The weight to be raised (in killogrammes) is equal to 942 times the weight of the rope per running metre, or 3100 times the weight of the rope per running foot. 3. For hempen ropes the weight to be raised (in killogrammes) is equal to 95 times the sectional area of the rope (in square centimetres). For the pound and inch units the factor 95 becomes 1361. In place of measurement for the area, or rather as a check on the result, the following rule may be used:—The weight to be raised in killogrammes is equal to 985 times the weight per running metre of the rope, or 3250 times the weight per running foot. When the rope is tarred the result given by the first rule must be multiplied by ·8, and the result given by the second rule by ·84. 4. For cast steel wire ropes the factors 7·31 and 10,500 given above for iron wire ropes should be replaced by 15 and 22,000 respectively. When men are being raised it is an observed rule that the weight in the cage should never exceed half the weight of mineral which is raised at one time.

The following form of wire rope cleaner and lubricator, applicable to flat and round ropes, has been satisfactorily used in England.

The ropes to be cleaned pass between a pair of flat wire brushes, the pressure of which on the ropes can be adjusted by a screw; two hoppers are placed below the brushes in order to catch the dirt which is removed. Lower down the ropes pass between a pair of revolving brushes, and then between a pair of rollers of soft material, which exert an adjustable pressure. These rollers are geared to the revolving brushes, and cause them to move in a direction contrary to that of the ropes. For cleaning the rope revolving wire brushes are used, and these, as they rotate, penetrate between the strands of the rope and leave the latter clean for receiving the lubricant. When oil or grease is to be applied, the rotating wire brushes are replaced by strong hair brushes, which are fed with lubricant from feeders above, this lubricant being thoroughly brushed into the outer strands of the rope. The changing of the revolving brushes can be effected very readily, and the brushes act equally well whether the rope is running

up or down. It is claimed for the machine described that, from the thorough manner in which the ropes are cleaned, their condition can be more readily and accurately determined by inspection, while, from the systematic manner in which the lubricant is applied, there is a great reduction of waste, and a better quality of lubricant can be profitably used.

COVERING FOR STEAM PIPES.

In my report for the year 1880 I gave some extracts from a paper read by Mr. W. J. Bird before the North of England Mining Institute on the condensation of steam in pipes. This gentleman has continued his researches into this matter, and the following remarks from his second paper will prove interesting.

A test was made of the comparative non-conducting powers of the following materials.

1. Silicate cotton. This is made by forcing air or steam through melted furnace slag. In its normal condition a cubic foot weighs 12 lbs. The cost of the material as applied to steam pipes is 2d. per square foot for each inch in the thickness of covering.

It was tested when enclosed with wood lagging, and external tubes of straw-board or sheet iron.

It was also tried in the form of mattresses which are sewed closely together over the surface to be protected, and then painted. A test was made of it in the condition of a cement formed by pulverising the silicate into a clay wash.

Toopes patent covering, composed of an inner circle of asbestos backed with compressed paper, and two outer circles of the same material with hair-felt between the layers. It is made about three-quarters of an inch in thickness, and costs tenpence-halfpenny per square foot.

A patent composition of a plastic and fibrous nature, which is mixed with water and plastered on the pipe. Its cost is about three-pence-farthing per square foot, at the thickness of one and a half-inches.

Hair-felt was also tested. Its cost is three pence halfpenny per square foot at a thickness of three quarters of an inch.

The following table shows the observations made on the various materials applied to two pipes, one 2·5 inches, the other 10·6 inches in diameter, external measurement.

NAME OF MATERIAL.	SMALL PIPE 2.5 (in.)				LARGE PIPE (10.6in.)			
	Tem. in deg.° Fah.				Tem. in deg.° Fah.			
	Thick- ness.	Pipe	Air	Diff.	Thick- ness.	Pipe	Air	Diff.
Uncovered pipe....	..	252	42	212	....	251	67	184
1. Silicate cotton.....	$\frac{3}{4}$	134	42	92	$1\frac{1}{2}$	126	67	59
2. Silicate cotton mattress..	$\frac{3}{4}$	108	42	66	....	....	....	....
3. Silicate cotton cement..	$\frac{3}{4}$	165	41	124	....	....	....	....
4. Toopes patent covering..	$\frac{3}{4}$	85	42	43	$\frac{3}{4}$	111	67	44
5. Patent composition.....	....	....	....	....	$1\frac{1}{2}$	124	67	57
6. Hair-felt .....	....	....	....	....	$\frac{3}{4}$	142	68	74

The heat loss of these steam pipes is due partly to radiation, and partly to air contact. If these quantities are added the total heat loss per hour per square foot is arrived at, from which the heat loss per foot length can be readily got. By comparing the heat loss of the covered and uncovered pipe, the percentage of heat retained by the coverings and their comparative efficiency will be seen, as in the following table:—

MATERIAL.	SMALL PIPE.				LARGE PIPE.			
	Thickness.	Heat loss units per hour.		per c'nt.	Thickness.	Heat loss units per hour.		per c'nt
		pr. sq foot.	pr. ft l'gth.			pr. sq foot.	pr. ft l'gth.	
Uncovered Pipe.....		514.3	336.6	...		357.7	990.8	...
1. Silicate Cotton.....	$\frac{3}{4}$	157.1	164.5	51.1	$1\frac{1}{2}$	89.9	320.0	67.7
2. " " Mattress.....	$\frac{3}{4}$	107.7	112.8	66.5	..	....	....	...
3. " " Cement.....	$\frac{3}{4}$	248.6	260.3	22.7	..	....	....	...
4. Toopes patent covering.....	$\frac{3}{4}$	65.2	68.3	79.7	$\frac{3}{4}$	66.4	208.5	78.9
5. Composition.....	..	....	....	...	$1\frac{1}{2}$	85.7	305.1	69.2
6. Hair felt.....	..	....	....	...	$\frac{3}{4}$	118.5	372.0	62.3

Mr. Bird having compared the heat-retaining efficiency of these materials, proceeds to estimate the absolute saving resulting from their adoption. He assumes the case of an underground engine deriving its steam power through a 10.6 inch pipe from boilers at bank 1000 feet distant. The total loss in heat units, generally speaking, is got by multiplying the loss per foot length by 1,000. Let it be assumed that one cubic foot of water, at 60 degrees, in the boiler evaporated to steam at any pressure, is equal to one nominal horse power, then 69,674 heat units is equal to one horse power. The loss of horse power in each case can then be arrived at. The cost of fuel is calculated at two cwts. of coal per 24 hours for each horse power at the rate of four shillings per ton.

MATERIAL.	STEAM PIPES. 10·6 inches external diameter, 1000 ft. length.									
	THICKNESS.	HORSEPOWER.		COST OF MATERIAL.						Fuel
	Applied	Loss	Sav'g	Total	per H. P.			saved pr.		
					£.	s.	d.	£.	s.	d.
Uncovered Pipe . . . . .	.....	14·22	—	—	£.	s.	d.	£.	s.	d.
Toopes' pat. covering.	$\frac{3}{4}$ inch	2·99	11·23	137 9 11	12	15	9	81	19	7
Composition	$1\frac{1}{2}$ "	4·38	9·84	48 4 2	4	18	0	71	16	8
Silicate cotton	$1\frac{1}{2}$ "	4·59	9·63	44 10 0	4	12	5	70	6	0
Hair-felt	$\frac{3}{4}$ "	5·34	8·88	45 16 3	5	3	2	64	16	6

This table shows how large and important a saving is effected by the use of non-conducting materials. The results arrived at in England are of even more importance in this country when the length and low temperature of our winters are considered. There are numerous other compositions, etc., used for this purpose, some of which are of equal value with those experimented on.

PUMPS.

The great depth reached by the miners of the Western States has called for much ingenuity in the construction of pumps, with a view both to economy and power. Our mines are as yet comparatively shallow, but many of the collieries work through slopes, and are compelled to convey steam and water for long distances. In this connection a paper by Mr. Joseph Moore, of San Francisco, on Hydraulic Pumps, will be found of interest.

In the history of the early sinking on the Comstock lode it was found that a limit was reached beyond which long rods, and a speed confined between three and six strokes were not the characteristics required by efficient pumps. When the joint pump shaft was nearing the Savage incline at a depth of 2,450 feet, hot water was met in such quantity that the question became immediately one of abandonment, or of greater pump power. At this crisis the Risdon Iron Co., of San Francisco, proposed to put in hydraulic pumps to raise 1,600 gallons of water per minute from the 2,400 feet level to the Sutro tunnel at 1,600 feet from the surface, and an additional quantity of 800 gallons per minute from the proposed 3,200 feet level to the 2,400 feet level. After some hesitation their offer was accepted, and the following machinery erected and put in successful operation.

It consisted of a steam engine placed at bank, working a hydraulic accumulator which by pipes worked a hydraulic engine 2400 feet from surface to raise water by plungers to the level of the Sutro tunnel. The engine is compound, having cylinders 35 and 70 inches in diameter, working direct four pumps $8\frac{1}{2}$ inch plungers. Those pumps force the water through an 8 inch pipe to an air vessel 25 inches internal diameter, and 70 feet high, and thence down the shaft to the hydraulic engines at the 2400 feet station, the exhaust water being returned to the surface through 10 inch pipes to be again pumped down the mine.

The pressure in the air-vessel is 960 lbs., consequently the pipes at the bottom have to sustain a pressure of about 2000 lbs. to the square inch. Arrangements have been made so that of the electric signals from the hydraulic pumps should fail, and the pumps stop without the knowledge of the engineer on the surface, no damage would result. An air-compressor supplying 60 cubic inches per minute at 1000 lbs. pressure was found amply sufficient to keep the air-vessels supplied with air. Underground there are two air-vessels on the discharge, and four on the inlet pipes. These vessels are 18 feet high, those in the discharge pipes being 14 inches, and those in the inlet pipes 13 inches in diameter. These keep the fluctuations within a few pounds pressure upon the columns. By an ingenious arrangement a feeding chamber is provided for filling the air-chamber at each station.

It is found that the proportion of power developed by the engine pumps is 90 per cent. The pumps raise daily per minute between 1600 and 1700 gallons, and could raise 10 per cent more. The engine is developing actual water pumped, not indicated horse-power in the cylinder of the engine, about 17 to 18 horse-power per cord of wood, the cord corresponding to about 1100 lbs. of coal, which compares very favourably with the best mill engine in California, and is better than the other pumping engines.

A similar system has been proposed by Mr. Baxter, well known as the inventor of the hot-air engine bearing his name. He uses a steam-pump on the surface by a water column, employs it to drive an ordinary rotary or direct acting pump underground. This system virtually does away with steam and pump rods, and permits the use at bank of compound and other economical forms of engines. The exhaust water can it is stated be satisfactorily returned to bank in the delivery pipe. This system, if efficient, would be found useful in many cases in mines where the use of steam-pipes and rods is inconvenient, and whose depth and operations do not warrant the introduction of the more expensive pump described above.

DAMS.

During the construction of the tunnel under Dorchester Bay at Boston, it became necessary to construct a brick dam to stand the pressure of a water column, 162 feet high, and, as it was intended to shut off a leak amounting to 240,000 gallons per 24 hours, it had to be water-tight. Mr. D. Stauffer gave the following description of this work before the Engineers's Club of Philadelphia :

The tunnel section at the point selected for the dam was practically 10 feet square. The bulkhead was built directly across the tunnel, 50 feet in front of the heading where the water was struck. Plank dams filled with puddle clay were first thrown across the tunnel, each side of the bulkhead site, and a 6-inch iron pipe used to carry off the water during construction—the pipe being built into the brickwork. An arched form was adopted, 4 feet thick at the crown and 2 feet rise in a span of 10 feet. Hard-burned bricks were used, laid in mortar made of one part English Portland, one part Newark

Rosendale, and two parts clean, sharp sand—a compound found equally strong with English Portland, and sand one to one, and having the advantage of working smoother on the trowel, and adhering better to brickwork in wet places. Skewbacks for the arch were roughly picked out in the rock at the sides. After the cement had set, the water was shut off by screwing, a cap on the outer end of the 6-inch pipe. The pressure against the wall was $72\frac{1}{10}$ pounds per square inch, or about 519 tons distributed over the face of the bulkhead. The wall was tight for about 48 hours; then water came through the *brick* itself, rather than through the joints, in amount equal to one-half the original volume. The water was let off and a second experiment tried. The main wall was torn down sufficiently to allow men to pass behind it, and a second wall only 12 inches thick was built back of the first, and two feet distant. The space between these walls was well rammed with puddle clay, extending to the rock on all sides. The second wall was made purposely light, as its yielding to the pressure would only more effectually consolidate the clay between it and the unyielding wall in front. The bond used in the main wall was one so laid that there were no continuous horizontal joints through the wall. The result of the last construction was completely successful. The tunnel is driven through a formation of clay slates, and conglomerates for its entire length; rock, very seamy, and much water encountered.

In mining bulkheads, which often must carry much greater pressures, the practice is to let the water rise slowly behind the bulkhead, by allowing a portion of the water to flow through a safety-valve at the bottom of the level. It has been the experience in all such cases that in the beginning quite a quantity of water will come through the pores of the brick-work, which is said to be “sweating.” Gradually, however, the pores are filled by carbonate of lime, etc., and a thick coat of that substance forms on the face of the bulkhead, completely cutting off the entire flow of water. A column of from 400 to 500 feet has been borne for many years by such bulkheads.

COAL WASHING.

One of the most serious objections to coal washing is the quantity of the fine dust carried off in the slimes. The adhesion of the water to the coal seems almost to overpower the force of gravity. The Hochstrate coal washer, as used during two years at the Rheinprussen Colliery, claims to meet this difficulty. The finest grades of the coal do not pass into the water-jig, but are subjected to a jet of air as they slide down an inclined plane. The effect of this treatment is to separate effectually the fine dust which is collected in a chamber. About 30 per cent. of the material charged to the blowing apparatus goes to the dust chambers, and as the dust is almost pure coal, there is a great saving over washed coal, as at least two-thirds of the fine coal is wasted by the ordinary methods.

COAL CUTTING MACHINERY.

During the past few years the use of power drills, etc., for cutting

coal has been extending in the Western States of America, and much of the American soft coal imported into Canada has been thus mined. Mr. G. D. Whitcombe, of Chicago, owner of the Harrison Mining Machine, has had one of his coal cutters built here recently, and purposes trying it in the Cumberland district. It is driven by compressed air, and is said to work rapidly, and to effect a very considerable economy. The machine consists of a drill with a fish tail point, driven rapidly against the coal, the direction, length and speed of the blows, being under the control of the operator. The machine is compact and readily handled, and, from its appearance, should not be at all liable to get out of order. The importance of being able in any way to increase the output of our mines during the season permitting of shipments, should render the study of all mechanical helps to rapid coal cutting of particular interest to our operators.

PULVERISERS.

Centrifugal pulverisers have for a number of years been used in England and on the Continent, and are now beginning to attract the attention of mill men in America. Among the best of these may be mentioned the Lucop and Cook pulveriser. It consists of a pair of arms mounted on a horizontal shaft, each carrying an iron ball weighing from 20 to 60 lbs. These balls slide in a stop in the arms, and are forced against a ring by the centrifugal pressure. The ore is subjected to an alternate percussive and grinding action, repeated until the desired fineness is reached. They are found to work well on all but the hardest varieties of quartz vein stone, and are easily kept in order.

CONCENTRATION.

The question of the adaptability of our ores of Gold, Copper and Lead, to concentration, has been frequently brought forward.

Many persons consider that the concentration of ore is a comparatively simple business, and hence the frequent disappointments experienced by those who have attempted this delicate operation with appliances lacking practical and technical requisites.

There are three points influencing any process of concentration, viz : The specific gravity, size, and shape. The main point however is the difference in specific gravity of the various bodies, when reduced to particles of the same size. In this case the greater the specific gravity the readier and more complete is the separation, as for example Galena (sp. gr. 7.5) is readily separated from quartz (sp. gr. 2.6), and less readily from Pitchblende (sp. gr. 6.47), Red Copper ore (sp. gr. 6.0), etc.

When an attempt is made to crush any rock for the purpose of concentration, it is found that when the material requires to be reduced to small particles, to completely free the mineral from adhering gangue, there is a large percentage formed of an almost impalpable dust. It is practically known to gold prospectors that gold and boulders are frequently found lying together in river channels. Without giving the physical reasons, it may be stated that in many respects

large particles of a light mineral move similarly to small particles of higher specific gravity. In the concentration, more particularly of gold and silver ores, the success of the operations is influenced by the shape of the particles, for scales and thin plates of a heavy mineral will float, and settle with a reduced speed rendering them liable to influences otherwise operating only on minerals of a lesser specific gravity.

From the above considerations it will appear that the application of any of the established methods of concentration to the ores most commonly met in Nova Scotia must be preceded by a careful study of the mineral and its accompanying gangue.

The first question naturally is whether the ore will pay for concentration, or prove more profitable if enriched by careful hand picking. All ores containing silver, as an accessory mineral, in the form of silver glance, etc., and many galena ores carrying their silver as minute particles of brittle silver ore, and gold ones carrying the metal in small masses of pyrites, etc., belong to the latter class. It is true that by sacrificing half of the metal sought for, the remainder may often be saved at a profit; but this applies only to the richer grades of ore. In the case of our gold veins carrying gold and silver with variable quantities of blende, pyrites, galena, etc., the usual practice has been to crush the ore with a view to saving the free or coarse gold, and to allow the pyrites, etc., to pass away.

Lately efforts have been made with a view of concentrating the pyrites, etc., from the tailings. So far these attempts generally have not yielded concentrates at all corresponding to the assay values of the ores. This may be attributed, among other causes, to the loss sustained by minute sub-division of the accessory minerals during the process of pulverisation necessary for obtaining the gold, which leads to an amount of slimes not manageable by any of the attempts yet made here to classify them. It may therefore be questioned if the stamping as practised here for retaining coarse gold by amalgamation is quite suited as a preliminary preparation for economical concentration.

The remark is frequently made that "rustiness" is the cause of much of the loss that is met in quartz milling. The following notes, from a paper read by Dr. Thomas Egleston before the American Institute of Mining Engineers, are of interest on this point:—

So called "rusty gold" from placers is not often met. It presents a brownish coating, and a colour redder than that of ordinary gold. Should the coating not cover the gold all over, it amalgamates readily, but if the covering is complete it may resist amalgamation. This film will crack off, and appears to be silica, or a silicate of iron, showing fine particles of gold under the microscope.

This is probably the only case of "rustiness" occurring in nature, but owing to the various processes of mining and milling, other causes retard or prevent amalgamation.

These may be divided into mechanical and chemical.

Thus a piece of gold hammered until the surface interstices are closed, will resist amalgamation for a considerable time. If it be heated, and cooled slowly, amalgamation takes place rapidly.

A strip of clean gold dipped into a solution of sulphureted hydrate of ammonia, and also into one of sulphureted hydrogen, was allowed to dry, and both these reagents were found to prevent amalgamation.

Gold exposed to fumes of sulphur would not amalgamate until heated sufficiently to permit the volatilisation of the latter. Alloys of gold with arsenic and antimony amalgamated readily. Phosphide of gold was found not to be acted on by mercury.

It will be seen that the stamp-mill is not, in all respects, a rationally designed machine. The action of pounding is likely to put some of the gold into such a condition that the mercury will not touch it, and to flour the gold as well as the quicksilver. There is, besides, in the mill every probability of the introduction of grease or greasy substances, like the powdered hydrated silicates of magnesia and of alumina, (slates) which not only froth but coat the gold with a lime which prevents the action of the mercury. If the water used in the mill is not pure, there is a further likelihood of the introduction of sulphureted hydrogen, and of other soluble sulphides, which act superficially on the small particles of gold and prevent the action of the mercury. To meet these points it would almost appear that the principle of the arrastra acting on the ore broken to a coarse powder would have to be again adopted.

During the past year the mineral resources of the Province were well illustrated at the Dominion Exhibition, held at Kingston, by the set of ores, etc., sent by your Honourable Government. The specimens were accompanied by a pamphlet giving a summary of the latest information relating to our mines which was prepared by me, at the request of the Government, for distribution there. As I have received numerous applications for copies during the last few months, I trust that it has been of some service in drawing attention to so important a matter.

The following papers relating to the Geology and Mineralogy of Nova Scotia have been published during the past year:

- H. FLETCHER. Richmond Co., C. B. Geological Survey of Canada.
- E. GILPIN. The Minerals of Nova Scotia. Report to the Government of Nova Scotia.
- E. GILPIN. The Gold Fields of Nova Scotia. North of England Institute of Mining Engineers.
- E. GILPIN. The Northern outcrop of the Cumberland Coal Field. N. S. Institute of Natural Science.

DR. HONEYMAN. Nova Scotia Geology, Superficial. Ibid.
Metalliferous Sands. Ibid.

C. HOFFMAN. Analyses of Nova Scotia Minerals. Geological Survey
of Canada.

S. D. MACDONALD. Geological Notes. N. S. Institute of Natural
Science.

I have the honor to be, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,
Inspector of Mines

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

No.	LESSEE.	DISTRICT.	Area Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, Sarah, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al	Tatamagouche.....	10½
LEAD.			
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River	1
IRON.			
PICTOU COUNTY.			
35	Carmichael, John R.....	East River	1
43	Hudson, James	"	1
CAPE BRETON COUNTY.			
86	Brookman, S. J., et al	N. Side East Bay	1
91	Brookman, Phoebe.....	East Bay.....	1
102	C. L. Ingraham	"	1
103	J. A. McKenzie	"	1
92	Matheson, D., et al.....	"	1
93	Brookman, S. J., et al	"	1
84	Protheroe, Pryse	Cow Bay.....	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co.	Whycocomagh.....	1

Total Area under lease..... 22½ square miles.

LIST OF COAL LEASES.

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
1	McKinnon, et al.....	ANTIGONISH CO.	3			
44	Baker, John W.		1			
13, 14, 15	Black, C. H. M.		3			
21	Blight, James, et al.....		1			
47	Boston, C. M. Co.....		1		John Moffatt....	River Herbert.
25	Campbell, Alex., et al....		1			
32, 34	Campbell, Alex., et al....		2			
35, 48, 49, 50	Campbell, Alex.....		4			
31, 33, 37, 38, 40, 41, 45, 46	Campbell, Alex.....		8			
12	Campbell, John.....		4	Working.	Jas. Baird.....	Maccan
17	Cumberland, C. M. Co....	Chignecto.....	3	.....	E. N. Sharp.....	St. John, N. B.
	Donville, James.....		2	Working.	B. B. Barnhill...	Joggins.
	Joggins, C. M. Association.	Joggins.....	2			
	Joggins, C. M. Co.....	Cumberland.....	1			
20	Kirby, Lewis R.....		2			
18, 19	Livesey, John		1			
5	Lawson, C. M. Association.	Maccan	1			
42	Macfarlane, Alex.....		1			
51	Milner, Christopher.....		1			
53	Milner, Christopher.....		1			
1, 2, 3, 4	New York & Acadia Co..	Scotia	4	Working.	William Bennett,	Maccan.

43	Pugwash & Sp'ng H'l R. Co.	.....	1	Working.	<i>William Hall.</i>	Spring Hill.
16	Seaman, Gilbert.....	.....	1	"	"	"
24	Shannon, S. L.....	.....	2		J. S. Hickman...	Amherst.
36, 39	Shannon, S. L. (in trust) et al	.....	2			
6, 7, 8	Spring Hill Mining Co..	Spring Hill.....	3			
52	" " " " " "	" " " " " "	4			
22, 23, 28, 29, 30	Styles Mining Co. (L'td).	.....	5			
9	Victoria Coal Mining Co.	.....	2			
26, 27	Wright, John V.....	.....	3			
			66			
			PICTOU CO.			
1	Acadia Coal Co.....	Fraser.....	1	Working.	H. S. Poole.	Stellarton.
3	" " " " " "	Acadia.....	1	"	<i>J. Maxwell...</i>	Westville.
42	" " " " " "	Pictou.....	4			
23	Allan, Sir Hugh, K't....	Vale.....	3	Working.	{ J. B. Moore.. <i>John Greener.</i>	New Glasgow. Vale Colliery.
10	Gray, B. G.....	.....	1			
11	Haliburton, R. G., et al..	.....	1			
			4	Working.	{ S. Cunard & Co <i>J. Rutherford</i>	Halifax. Stellarton.
13, 14	Halifax Co'y, (L't'd.)	Albion.....	2			
12	Intercolonial Co'y.....	.....	1	Working.	Robert Simpson..	Westville.
6	" " " " " "	Drummond.....	1			
15, 30, 31	Kirby, Lewis R.....	.....	3			
25	Merigomish Co'y.....	.....	4			
20	Nova Scotia Co'y.....	Black Diamond...	2			
24	Price, D. E., et al.....	.....	1		M. H. Angell....	Westville.
			29			

10, 21	Gibson, John, et al.....	.....	2	Working.	{ E. P. Archbold . Henry Mitchell.	Halifax. Little Glace Bay..
4, 12, 16	Glace Bay Mining Co.....	Glace Bay	3			
75	Henry, W. A.....	.....	1			
22	Ingraham, R. J. and J. L....	Halfway	1			
6, 13, 18, 19	International C. & R. Co...	International	4	Working.	{ R. Belloni..... P. Johnstone....	Cow Bay. Bridgeport.
71	Jennings, Edward .....	.....	1			
47	LeCras & McInnes.....	.....	1			
66	Merchants' Bank of Canada..	Gardener.....	2			
74	Moore & Moseley.....	.....	1 $\frac{1}{4}$			
81	Morton, Lemuel J.....	.....	1			
80	McDonald, James.....	.....	1			
101	McDonald, W. B.....	.....	1			
52, 53	McLeod, Hugh .....	.....	2			
88, 89, 90	Paint, Henry N., and others.	.....	3			
83, 85	Protheroe, Pryse .....	.....	2			
73, 82	Reid, Thos. S. (sea area)....	.....	2			
40, 41, 42	Ross, H. E., et al. ....	.....	3			
79	Ross, W. J., et al (sea area).	.....	1			
43	South Head Coal Co.....	South Head	1			
32	Sword, Wm., (sea area) .....	.....	3			
54 to 62	Sydney C. M. Co. (sea areas)	.....	10			
46	Todd, A. Thorton.....	Collins	1			
67	Weatherbe & Kirby .....	.....	1			
78	Weatherbe, R. L., (sea area).	.....	5			
34, 35, 36	Victoria C. M. C., (sea area).	Victoria.....	5			
50, 51	" .....	.....	2			
			131 $\frac{3}{4}$			

LIST OF COAL LEASES—(Continued.)

No.	LESSEE.	COLLIERY.	Area Sq. Miles	WORKING.	AGENT AND Manager.	POSTAL ADDRESS.
5	Aylmer, John Evans Freke	INVERNESS CO. Cape Mabou.....	2			
8	Evans, Thomas.....	Chimney Corner..	1			
9	Evans, Thomas, (<i>sea area</i>)	.....	1			
7, 12	Inverness C. I. & R. C....	.....	2	Working.	{ Alex. Wright.. D. McKay.....	Moncton. Broad Cove.
13	Murray, George	Port Hood.....	3			
4	Richey, M. H., et al.....	.....	1			
11	Ross, W. J.....	Broad Cove.....	1			
6	Ross, H. E., et al, (<i>sea area</i>)	.....	1			
14, 15	Smyth, Peter.....	.....	2			
10	Trenaine, E. D., (<i>sea area</i>)	.....	1			
17	McDonald, Hugh.....	.....	1			
			16			
2	Marraud, A. E.....	RICHMOND CO. Little River.....	1			
			1			
2	Campbell, Chas. J.....	VICTORIA CO. New Campbellton.	3		John McDonald.	N'w Campbell'tn
3, 4, 5	Ross, William.....	Black Rock.....	5			
			8			
Total area under lease.....			255½	square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	57,089	43,142	87,086	65,575	61,286	13,134	423	47	205,884	121,898
2nd Quarter.....	59,578	55,539	121,815	105,015	141,786	96,433	.....	.....	323,179	256,987
3rd Quarter.....	64,375	61,109	134,096	145,656	253,819	287,195	.....	78	452,290	494,038
4th Quarter.	62,242	58,559	137,956	129,891	184,260	188,806	.....	.....	384,458	377,256
Total	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179
1881	183,419	171,149	372,197	346,968	568,509	516,852	245	45	1,124,270	1,035,014
1880	143,085	134,671	461,811	434,922	422,884	380,848	4,930	4,218	1,032,710	954,659
1879	99,222	90,671	388,486	330,878	295,984	262,924	4,579	4,151	788,271	688,624

TABLE B. — COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.		GRAND TOTAL.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia—											
Land Sales.....	23,782	17,443	113,720	78,672	1,122	4,021	68	.....	138,692	110,136	238,828
Sea-borne.....	4,146	141	43,568	8,085	158,675	5,509	.....	.....	206,389	13,735	220,124
Nova Scotia—Total...	27,928	17,584	157,288	86,757	159,797	9,530	68	.....	345,081	113,871	458,952
Quebec.....	56,029	2,532	123,985	1,536	197,000	1,892	57	.....	377,071	5,960	383,031
New Brunswick,....	66,910	46,525	6,821	1,949	30,727	685	.....	.....	104,458	49,159	153,617
Newfoundland.....	.....	.....	1,145	.....	76,561	2,026	.....	.....	77,706	2,026	79,732
P. E. Island.....	.....	.....	17,816	23,647	7,098	1,535	.....	.....	24,914	25,182	50,096
West Indies.....	.....	.....	.....	.....	22,386	.....	.....	.....	22,386	.....	22,386
United States.....	414	427	22,072	2,898	25,988	47,503	.....	.....	48,474	50,828	99,302
Other Countries.....	.....	.....	223	.....	2,766	74	.....	.....	2,989	74	3,063
Total.....	151,281	67,068	329,350	116,787	522,323	63,245	125	.....	1,003,079	247,100	1,250,179
1881.....	127,756	49,413	257,573	89,395	446,649	70,203	45	.....	826,003	209,011	1,035,014
1880.....	99,491	35,180	326,870	108,052	346,103	34,745	4,218	.....	776,681	177,977	954,659
1879.....	71,700	18,881	255,674	75,204	243,290	19,664	4,151	.....	574,905	113,719	688,624

COAL—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1882.	Year 1881.
Nova Scotia.						
Land Sales.....	60,772	52,602	52,840	72,614	238,828	200,668
Sea borne.....	10,148	51,471	77,988	80,517	220,124	181,745
N. Scotia.—Total..	70,920	104,073	130,828	153,131	458,952	382,413
Quebec	21,943	76,068	211,241	73,779	383,031	268,628
New Brunswick ...	22,209	37,317	47,737	46,354	153,617	123,526
Newfoundland....	2,647	10,810	29,657	36,618	79,732	62,174
P. E. Island		8,236	22,441	19,419	50,096	49,313
United States	1,368	15,501	45,135	37,298	99,302	113,728
West Indies	2,811	4,916	5,532	9,127	22,386	21,620
South America.....			159	1,303	1,462	561
Europe		66	1,308	227	1,601	13,051
Total.....	121,898	256,987	494,038	377,256	1,250,179	1,035,014
1881 ..	94,219	246,475	396,612	297,708	1,035,014	1,035,014
1880 ..	76,644	224,138	403,909	249,968	954,659	954,659

COAL.—GENERAL STATEMENT.

1882.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	205,884	121,898	29,596
2nd Quarter.....“	323,179	256,987	25,124
3rd Quarter.....“	452,290	494,038	26,942
4th Quarter.....“	384,458	377,256	29,719
Total.....	1,365,811	1,250,179	111,381
1881.....	1,124,270	1,035,114	107,888
1880.....	1,032,710	954,659	96,831
1879.....	788,271	688,624	84,787

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DEC. 31ST, 1882.

COLLIERIES.	SEAMS.	PRODUCE.	SALES.				COLLIERY CONSUMPTION.		
			Paying Royalty.	Free.	Total.	Per Cent.	Engines.	Workmen.	Per Cent.
CUMBERLAND COUNTY.									
Chignecto.....	North Seam	12504	9600	1137	10737	86	1572	223	13
Joggins.....	Main	20178	16919	1477	18396	99	2352	283	13
Minudie	Minudie.	200	92	83	175	87	.....	.....	.....
Scotia	North	1049	817	208	1025	99	.....	.....	.....
Springhill.....	Black, North & South	200353	123853	64163	188016	94	9442	2801	6
Styles	Styles .....	.....	.....	.....	.....	.....	.....	.....	.....
PICTOU COUNTY.									
Acadia	Acadia	105569	67858	30287	98145	93	5742	1857	7
Albion	Third & McGregor...	141090	85334	37135	122469	81	11646	3283	10
Intercolonial	Acadia	150486	107760	33639	141399	94	6339	2848	6
Vale	McBean	92808	68398	15726	84124	90	7845	3882	12
CAPE BRETON COUNTY.									
Blockhouse.....	Blockhouse	61753	57392	55	57447	93	2800	1506	6
Caledonia	Phelan	59893	45973	13323	59296	100	1393	931	4
Glace Bay	Harbor	70186	64203	4846	69049	99	2327	1334	5
Gowrie.....	McAuley	62256	52212	13152	65364	100	850	1067	3
International.....	Harbor	109286	89266	13661	102927	94	1604	1529	3
Lingan.....	Lingan Main.....	2650	42	22	64	2	1687	403	.....
Ontario.....	Phelan	24541	22867	499	23366	95	817	555	5
Reserve.....	Phelan	93828	69465	4967	74432	79	2730	2366	5
Sydney Mines.....	Sydney Main.....	156758	120903	12720	133623	85	18967	8284	6
INVERNESS COUNTY.									
Broad Cove.....	.....	250	118	.....	118	.....	.....	10	.....
RICHMOND COUNTY.									
Little River.....	.....	173	7	.....	7	.....	150	6	.....
			1003079	247100	1250179	.....	78213	33168	.....

Statement of the Number and Classes of Men employed, and average results of each Colliery, during the year ended Dec. 31st, 1882.

COLLIERIES.	UNDERGROUND.				SURFACE.			CONSTRUCTION.		TOTAL.		AVERAGE NO. OF DAYS PER PERSON.		Average No. of tons per cutter.	Average tons per day per cutter.	Average quantity raised per day, Tons.	HORSES.		PITS. WORKED	
	Days Labor.		Mechanics.	Laborers.	Boys.	Days Labor.	Persons.	Days Labor.	Persons.	Under-ground.	Surface.	Above.	Below.							
	Skilled Laborers.	Boys.																		
CUMBERLAND Co.																				
Chignecto.....	34	15	5	16168	11	24	4	10885	26	9781	119	36834	298	278	367	1-2	42	4	2	298
Joggins.....	54	9	12	21028	15	13	5	8170	29	9770	137	38968	280	287	373	1-3	70	9	5	286
Minudie.....	4	3	...	700	5	3	...	2050	2	25	17	2775	100	256	...	...	...	1	...	...
Scotia.....	4	...	...	792	2	1	1	390	...	...	8	1182	198	97	...	...	...	1	...	130
Spring Hill.....	172	90	62	91790	31	75	11	25396	10	2963	451	120149	283	216	1164	4-0	695	3	17	288
Styles.....	...	...	...	...	8	...	...	416	3	156	11	572	...	...	...	...	...	...	...	...
PICOU Co.																				
Acadia.....	88	62	20	45759	19	39	6	19882	3	187	237	65828	269	310	1200	4-4	371	6	6	284
Albion.....	240	49	45	62643	53	142	39	66288	6	660	574	129591	187	283	587	2-2	540	22	9	261
Intercolonial.....	138	67	73	73822	32	61	10	31604	9	2328	390	107754	265	306	1090	4-8	662	9	12	227
Vale.....	176	35	19	58487	39	42	5	27276	...	...	316	85763	254	317	521	3-0	405	3	4	229
CAPE BRETON Co.																				
Blockhouse.....	71	8	37	20857	24	33	5	16390	...	...	178	37247	180	264	867	5-4	389	13	23	158
Caledonia.....	76	9	16	21980	15	34	8	14169	2	791	160	36940	217	248	788	4-8	310	4	15	193
Glace Bay.....	97	16	14	21091	26	23	4	13512	...	...	180	34603	165	254	723	3-3	326	6	9	215
Gowrie.....	97	12	49	33579	16	44	15	18087	2	250	235	51916	212	238	641	3-1	303	6	32	205
International.....	135	15	48	44216	21	65	4	24945	2	606	290	69767	223	277	809	4-5	610	6	33	179
Lingan.....	10	1	3	1673	2	15	4	5906	...	...	35	7579	...	...	...	...	...	1	3	23
Ontario.....	35	3	8	9381	7	16	3	5171	...	...	72	14552	204	200	700	3-0	107	6	5	228
Reserve.....	118	18	30	35612	21	25	4	10813	...	...	216	46425	214	215	795	3-7	432	2	17	217
Sydney Mines.....	240	39	93	88697	69	103	39	60475	3	1220	586	150392	238	286	653	2-5	612	12	41	256
RICHMOND Co.																				
Little River.....	2	1	...	130	...	3	...	60	...	...	6	190	...	...	...	...	...	...	...	45
INVERNESS.																				
Broad Cove.....	...	4	1	191	2	9	1	733	...	...	17	924	...	...	...	...	...	...	2	23
Total.....	1791	456	535	648596	418	770	168	362618	97	28737	4235	1039951	233	267	762	3-2	...	114	235	236

COLLIERY CONSTRUCTION ACCOUNT — 1882.

COLLIERIES.	Shafts.	Slopes.	Levels.	Adits.	Machinery.	Colliery Build-ings.	Surface Works.	Railways	Wharves.	Prospect-ing.	TOTAL.
CUMBERLAND Co.											
Chignecto	\$	\$9800 00	\$4537 00	\$	\$ 10000 00	18000 00	\$6650 00	\$4737 00	\$	\$ 750 00	\$ 54474 00
Joggins	375 00	4492 00	.....	.....	9540 00	2310 00	2180 00	6850 00	.....	.....	25747 00
Minudie .....	.....	2500 00	.....	.....	8500 00	4761 00	1300 00	.....	.....	.....	17061 00
Scotia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springhill .....	.....	2133 00	.....	.....	16325 00	2100 00	935 27	2817 00	.....	4226 50	28536 77
.....	.....	220 00	222 00	.....	100 00	155 00	300 00	.....	.....	250 00	1247 00
Pictou Co.											
Acadia .....	.....	.....	.....	.....	273 84	225 03	.....	.....	.....	.....	498 87
Albion .....	.....	.....	.....	.....	2630 51	1358 03	2545 10	621 15	.....	.....	7154 79
Intercolonial	4067 22	.....	989 17	.....	6396 27	1634 23	224 72	2347 02	.....	.....	15658 63
Vale .....	.....	.....	.....	.....	20350 00	.....	.....	5181 00	.....	.....	25531 00
CAPE BRETON Co.											
Blockhouse .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caledonia .....	.....	.....	337 45	.....	.....	.....	461 65	.....	.....	.....	799 10
Glace Bay .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gowrie	1020 00	259 00	439 00	.....	.....	800 00	300 00	1060 00	.....	.....	3878 00
International .....	.....	.....	.....	.....	.....	650 00	.....	.....	.....	939 63	1589 63
Lingan .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	453 00	453 00
Reserve	293 97	1278 75	2093 04	1119 94	.....	.....	.....	.....	.....	.....	4785 70
Ontario	100 00	326 34	583 40	.....	2432 11	320 50	58 00	1354 53	324 00	.....	5498 88
Sydney Mines .....	.....	.....	.....	.....	.....	1250 40	.....	.....	.....	.....	1250 40
INVERNESS Co.											
Broad Cove .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
RICHMOND Co.											
Little River .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
VICTORIA Co.											
New Campbellton .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	\$85856 19	21009 09	\$9201 06	\$1119 94	\$ 76547 73	33564 19	14954 74	24967 70	\$ 324 00	\$6619 13	\$ 194163 77

Nova Scotia Coal Sales from 1875 to 1882 (inclusive).

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1831	37,170	Forw'd 368,196
1786	2,000		1832	50,396	
1787	10,681		1833	64,743	
1788			1834	50,813	
1789			1835	56,434	
1790			1836	107,593	
1791	2,670		1837	118,942	
1792	2,143	1838	106,730		
1793	1,926	1839	145,962		
1794	4,405	1840	101,198	839,981	
1795	5,320	1841	148,298		
1796	5,249	1842	129,708		
1797	6,039	1843	105,161		
1798	5,948	1844	108,482		
1799	8,947	1845	150,674		
1800	8,401	1846	147,506		
		51,048	1847	201,650	1,533,798
1801	5,775		1848	187,643	
1802	7,769		1849	174,592	
1803	6,601		1850	180,084	
1804	5,976		1851	153,499	
1805	10,130		1852	189,076	
1806	4,938		1853	217,426	
1807	5,119	1854	234,312		
1808	6,616	1855	238,215		
1809	8,919	1856	253,492		
1810	8,609	70,452	1857	294,198	2,399,829
1811	8,516		1858	226,725	
1812	9,570		1859	270,293	
1813	9,744		1860	322,593	
1814	9,866		1861	326,429	
1815	9,336		1862	395,637	
1816	8,619		1863	429,351	
1817	9,284	1864	576,935		
1818	7,920	1865	635,586		
1819	8,692	1866	558,520		
1820	9,980	91,527	1867	471,185	4,927,339
1821	11,388		1868	453,624	
1822	7,512		1869	511,795	
1823	27,000		1870	568,277	
1824			1871	596,418	
1825			1872	785,914	
1826	12,600		1873	881,106	
1827	12,149	1874	749,127		
1828	20,967	1875	706,795		
1829	21,935	1876	634,207		
1830	27,269	140,820	1877	697,065	7,377,428
			1878	698,511	
			1879	688,626	
			1880	954,659	
			1881	1,035,014	
			1882	1,250,179	
			Total...	19,731,764	

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 " 1800.....	51,048	1841 " 1850.....	1,533,798
1801 " 1810.....	70,452	1851 " 1860.....	2,399,829
1811 " 1820.....	91,527	1861 " 1870.....	4,927,339
1821 " 1830.....	140,820	1871 " 1880.....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	18,173	24 ad.	1867	338,492	\$1.25
1851	116,274	"	1868	228,132	"
1852	87,542	"	1869	257,485	"
1853	120,764	"	1870	168,180	"
1854	139,125	Free.	1871	165,431	"
1855	103,222	"	1872	154,092	.75
1856	126,152	"	1873	264,760	"
1857	123,335	"	1874	138,335	"
1858	186,743	"	1875	89,746	"
1859	122,720	"	1876	71,634	"
1860	149,289	"	1877	118,216	"
1861	204,457	"	1878	88,495	"
1862	192,612	"	1879	51,641	"
1863	282,775	"	1880	123,423	"
1864	347,594	"	1881	113,728	"
1865	465,194	"	1882	99,302	"
1866	404,252	"			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD. — GENERAL STATEMENT FOR THE YEAR 1882.

Showing the number of Mines at work, days' labor performed, quantities of Quartz crushed, yield of Gold, for the year ended December 31st, 1882.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills Employed.	Steam Power.	Water Power.	Quartz, &c. Crushed.	Yield per Ton.		Maximum Yield per Ton.		Total Yield of Gold.		Average yield per man per day for 12 months at \$18.00 per oz.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.		
Caribou	2	7,973	1	1	..	1,601	0	7	1	19	588	6	11	1.32
Gay's River .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Montagu	2	6,044	2	2	..	586	1	3	3	0	684	9	22	2.03
Oldham	2	2,798	2	1	1	690	0	11	4	12	411	6	12	2.64
Renfrew	1	3,724	1	..	1	416	0	9	0	9	196	19	10	.94
Sherbrooke	8	24,058	6	4	2	6,251	0	8	4	7	2,542	17	14	1.90
Stormont	1	6,908	1	1	..	511	1	15	3	6	903	17	16	2.35
Tangier	3	11,001	3	2	1	1,622	0	9	3	14	789	11	16	1.29
Uniacke	3	9,128	4	3	1	3,440	0	10	3	0	1,786	4	9	3.52
Waverley	1	2,238	2	1	1	554	0	8	2	15	234	7	5	1.88
Wine Harbor	2	1,739	1	..	1	145	0	12	0	12	91	9	0	.94
Unproclaimed	5	31,273	5	2	3	5,265	1	2	4	8	5,877	14	1	3.30
	30	106,884	28	17	11	21,081	0	12	4	12	14,107	3	20	2.37

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARIBOU.							GAYS' RIVER.							MONTAGU.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Ozs.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January.....	4	960	38	311	41	9	12	..	...	..	..	..	...	..	2	730	30	87	155	11	0
February.....	4	838	33	92	111	8	12	..	...	..	..	..	...	..	2	667	26	30	26	15	6
March.....	2	266	11	76	17	4	..	..	...	..	..	..	...	..	2	626	25	38	49	0	7
April.....	3	640	25	46	10	16	..	..	...	..	..	..	...	..	2	729	30	70	111	3	15
May.....	3	748	30	32	25	17	..	..	...	..	..	..	...	..	3	949	34	66	94	7	0
June.....	2	509	20	102	71	7	19	..	...	..	..	..	...	..	3	629	25	88	77	4	9
July.....	3	652	26	134	38	19	20	..	...	..	..	..	...	..	2	423	17	108	34	13	11
August.....	2	597	25	151	22	18	11	..	...	..	..	..	...	..	2	521	21	22	31	13	16
September.....	3	588	25	8	3	17	1	..	...	..	..	..	...	..	1	273	12	18	29	9	6
October.....	2	456	18	147	26	15	11	..	...	..	..	..	...	..	1	...	..	42	54	6	0
November.....	2	920	36	216	85	10	18	..	...	..	..	..	...	..	1	232	9	17	20	6	0
December.....	1	799	32	286	132	2	3	..	...	..	..	..	...	..	1	265	10	..	..	..	..
	2	7973	...	1601	588	6	11	..	...	..	..	..	...	..	2	6044	...	586	684	9	22

MONTHLY STATEMENT FROM EACH GOLD DISTRICT (CONTINUED).

NAME.	OLDHAM.							RENFREW.							SHERBROOKE.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.
January.....	2	200	8	50	36	12	1	1	236	10	88	21	10	0	7	2132	90	208	159	15	0
February.....	.	...	..	..	...	...	...	1	200	8	43	38	0	0	7	1728	69	550	205	6	0
March...	.	...	..	15	8	10	10	1	315	14	..	..	...	...	7	1917	76	212	187	3	0
April.....	2	300	12	25	10	0	16	1	224	9	48	26	10	0	5	682	27	185	142	19	0
May.....	2	205	8	6	6	11	0	2	389	15	35	21	6	10	8	1049	42	313	108	5	0
June.....	2	360	14	59	115	8	20	2	655	26	86	31	10	0	9	1862	74	489	120	1	0
July.....	2	423	17	108	34	13	11	2	690	28	46	36	3	0	9	1820	72	612	220	2	0
August.....	2	312	12	109	47	4	13	2	571	23	70	22	0	0	10	2430	100	617	257	7	0
September.....	2	134	6	133	50	5	13	2	444	17	..	..	...	...	10	2482	100	760	238	9	0
October.....	2	259	10	147	56	0	0	.	....	..	..	..	...	...	7	2366	94	467	142	1	2
November.....	2	269	11	38	46	0	0	.	....	..	..	..	...	...	10	2678	107	959	391	4	0
December.....	2	336	13	...	...	...	...	.	....	..	..	..	...	...	19	2912	111	879	370	5	12
	2	2798	...	690	411	6	12	1	3724	...	416	196	19	10	8	24058	...	6251	2542	17	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

MONTH.	STORMONT.							TANGIER.							UNIACKE.						
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwts.	Grns.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwts.	Grns.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwts.	Grns.
January	1	6,908	....	511	903	17	16	3	11001	....	16222	789	11	16	3	9128	....	3440	1786	4	9
February	1	.....	.....	.....	.....	.....	.....	2	348	14	.....	.....	.....	.....	3	617	24	157	62	5	6
March	1	.....	.....	.....	.....	.....	.....	1	394	16	42	68	9	9	3	625	25	196	103	1	4
April	1	.....	.....	51	149	13	0	3	653	26	243	170	1	18	5	448	17	203	189	0	1
May	1	640	25	75	81	5	0	3	557	22	200	77	17	18	4	1,143	46	366	266	7	0
June	1	832	33	84	144	0	0	2	386	16	49	15	6	16	6	1,004	40	507	283	2	6
July	1	950	38	76	110	0	0	3	983	39	175	60	3	11	3	1,109	45	180	100	4	12
August	1	1,109	44	71	136	1	4	3	1125	45	.....	.....	.....	.....	3	716	28	268	93	2	11
September	1	1,200	48	.....	.....	.....	.....	2	1251	50	150	3	11	4	3	738	33	415	233	16	0
October	1	822	33	.....	.....	.....	.....	3	1432	53	40	14	0	0	3	543	21	208	155	3	0
November	1	925	37	116	196	19	12	3	1817	72	185	110	0	0	3	661	26	199	73	11	11
December	1	430	17	38	85	19	0	3	1535	61	376	166	10	0	3	730	30	414	112	6	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT. — (CONTINUED.)

MONTH.	WAVERLEY.							WINE HARBOR.							UNPROCLAIMED.							
	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	Men.	Tons.	Oz.	Dwt.	Grs.	
January	2	752	30	109	21	4	0	2	532	21	45	..	..	..	0	4	2821	110	450	542	16	4
February	3	711	29	237	55	19	0	2	253	10	45	33	0	0	4	4	2179	87	426	494	10	0
March	2	100	4	9	12	1	0	2	169	7	..	..	..	..	4	4	2214	89	465	494	12	18
April	1	40	2	8	26	16	0	2	532	21	10	4	6	0	4	4	2771	110	440	450	5	20
May	1	20	1	29	7	15	0	2	253	10	80	49	14	0	4	4	2793	112	467	474	15	15
June	1	30	2	19	12	9	0	..	....	..	10	4	9	0	4	4	2724	109	456	493	2	4
July	1	50	2	36	19	8	0	..	....	..	..	..	..	..	9	4	2123	85	324	309	10	15
August	1	120	5	29	39	14	0	..	....	..	..	..	..	..	5	4	3000	120	391	481	0	19
September	1	200	8	39	16	1	0	..	....	..	..	..	..	..	7	4	3500	140	966	1045	2	19
October	2	105	4	9	17	10	0	..	....	..	..	..	..	..	5	4	2483	99	443	554	3	7
November	2	76	3	25	3	10	0	..	....	..	..	..	..	..	6	4	2301	92	111	172	3	0
December	2	34	2	5	2	0	5	..	....	..	..	..	..	..	6	4	2364	94	326	365	11	0
	1	2238	....	554	234	7	5	2	1739	....	145	91	9	0	5	4	31273	....	5265	5877	14	1

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold Extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.	Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz. Dwt. Gr.		A day.	A year.
1862	7,275			6,473	1 2 11	156,000	\$ 83	\$249
1863	14,001	14	17	17,002	16 11	273,624	92	276
1864	20,022	18	13	21,434	18 16	252,720	1 42	426
1865	25,454	4	8	24,423	1 0 20	212,966	2 15	645
1866	25,204	13	2	32,161	15 2	211,796	2 14	642
1867	27,314	11	11	31,386	17 9	218,894	2 24	672
1868	20,541	6	10	32,262	12 17	241,462	1 53	459
1869	17,868	0	19	35,147	10 4	210,938	1 52	456
1870	19,866	5	5	30,829	12 21	173,680	2 05	615
1871	19,227	7	4	30,791	12 11	162,992	2 12	636
1872	13,094	17	6	17,093	15 7	112,476	2 09	627
1873	11,852	7	19	17,708	13 9	93,570	2 28	684
1874	9,140	13	9	13,844	13 5	77,246	2 12	636
1875	11,208	14	19	14,810	15 4	91,698	2 20	660
1876	12,038	13	18	15,490	15 13	111,304	1 94	582
1877	16,882	6	1	17,369	19 10	123,565	2 46	738
1878	12,577	1	22	17,990	13 23	110,422	2 05	615
1879	13,801	8	10	15,936	17 8	92,002	2 34	702
1880	13,234	0	4	14,037	18 20	103,826	2 18	54
1881	10,756	13	2	16,556	12 20	126,308	1 52	456
1882	14,107	3	20	22,081	12 18	106,884	2 37	711
Total	335,470	3	3	444,822	.....	3264373	.....	.....

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

GYPSUM EXPORTS—Ton of 2,000 lbs.

Windsor.....	Tons.	93,273	Value.....	\$92,697
Cheverie.....	"	29,015	"	19,170
Hantsport.....	"	5,078	"	4,614
Walton.....	"	4,980	"	3,509
Baddeck.....	"	1,080	"	1,000
Total.....	"	133,426	.....	\$ 120,990

BUILDING STONE.

Antigonish.....	Tons.	14	Value.....\$	56
Pictou	"	583	"	3,041
Wallace.....	"	5,500	"	14,000
Pugwash.....	"	260	"	1,437
Total.....	"	4,357		\$18,534

GRINDSTONES, ETC.

Messrs. A. Seaman & Co., Lower Cove, Cumberland Co.

2,400 tons Grindstones	Value.....	\$28,800
3,500 boxes Scythestones	"	3,500
		<hr/>
		\$32,300
50 tons Grindstones, Windsor.....	Value.....\$	50

MOULDING SAND.

Windsor.....	Tons	400	Value.....\$	600
--------------	------	-----	--------------	-----

IRON MINING.

Londonderry:	39,135 tons
Guysboro	3,000 "
Total	42,135 "

AVERAGE FORCE EMPLOYED DAILY.

Belowground, Miners	75	Days worked	16,717
Laborers	72	"	15,288
Aboveground Mechanics	16	"	4,012
Laborers	43	"	8,292
Total	206	"	44,309

Fluxes—Ankerite	Tons.	4,584
" Limestone	"	12,000
Total		16,584

MANGANESE.*

	Tons.	Average No. persons employed.
Tenny Cape	120	}
Walton	6	
Cheverie	21	
Valley	6	
Loch Lomond	56	..... 5
Total	205	

*NOTE.—These mines do not work continuously.

STATEMENT of Coal (in tons) received at the following Stations on the Intercolonial Railway from Mines in Nova Scotia, for the year ending 31st December, 1881, and for the year ending 31st December, 1882.

STATIONS.	QUANTITY.		STATIONS.	QUANTITY.	
	1881.	1882.		1881.	1882.
Halifax.....	49,629	58,039	Salisbury....	779	1,896
Bedford	438	469	Petitcodiac...	198	248
Windsor Junc.	4,252	5,614	Penobsquis...	932	1,403
Wellington...	76	62	Anagance....	6	.....
Enfield	448	439	Sussex	616	548
Elmsdale.	106	182	Apohaqui....	44	37
Milford	70	70	Norton.....	18	29
Shubenacadie.	366	391	Bloomfield. .	.....	12
Stewiacke....	184	281	Passekeag....	38	22
Brookfield ...	60	66	Hamilton....	580	979
Truro	4,726	6,114	Nauwigewauk	6	.....
Valley.....	22	12	Rothsay.....	177	343
Riversdale ...	.....	10	Cold Brook ..	1,378	2,486
West River...	28	18	St. John.	8,938	19,997
Hopewell	120	576	Berry's Mills..	6	8
Stellarton....	7,538	6	Welsford	32	41
New Glasgow..	4,896	9,974	Kent Junct'n.	.....	27
Pictou Land'g.	58,931	63,160	Carleton.	6	.....
Belmont.....	12	22	Chatham.....	641	942
DeBert	46	36	Newcastle....	162	428
Londonderry .	64,466	70,082	Bathurst	40	118
Wentworth....	42	49	Jacquet River	.....	8
Greenville....	54	48	New Mills...	12	12
Thomson.....	44	30	Charlo.....	12	16
Oxford.....	258	478	Dalhousie....	.....	58
River Philip..	22	18	Campbellton..	136	171
Athol	12	8	Little Metis..	.....	33
Maccan	12	48	St. Flavie....	10	15
Nappan.....	.....	122	Rimouski....	78	359
Amherst.....	3,127	3,379	Trois Pistoles..	.....	39
Aulac.....	251	252	Isle Verte....	.....	11
Sackville.....	1,170	1,961	Riv. DuLoup..	32	26
Dorchester....	4,501	24,571	St. Thomas ..	.....	23
Memramcook..	138	154	St. Charles...	20	21
Painsec	12	4	Chaudiere....	30,629	34,426
Shediac.....	180	348	Point Levi...	.....	663
Point DuChene	68	106	Flag Stations..	42	.....
Moncton.....	9,457	12,227	.....	.....	.....
				278,230	324,871

INTERCOLONIAL RAILWAY.

STATEMENT, *giving the quantities (in tons) of the different kinds of Coal, received from the various Mines for the use of the Inter-colonial Railway during the year 1881.*

MONTHS.	ACADIA.	ALBION.			VALE.	SPRING HILL.
		Round.	Small.	Coke.		
January.....	16		108		1360	6965
February.....			32		2095	6984
March.....			26	10	3113	6945
April.....		21	21		1965	6431
May.....			48	10	646	6605
June.....			53		1545	4329
July.....	10		121		1163	4304
August.....			101	10	1546	5755
September.....			55	10	1184	3918
October.....	36	119	117		2495	5868
November.....	19	53	115		1320	7215
December.....		199	121	10	2183	8263
	81	392	928	50	20615	73582

(Sg'd) T. V. COOKE,
General Storekeeper.

GENERAL STOREKEEPER'S OFFICE,
Moncton, N. B., Feb. 6, 1882,

INTERCOLONIAL RAILWAY.

STATEMENT showing the quantities (in tons) of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway during the year 1882.

MONTHS.	ACADIA.	ALBION.			DRUMMOND.	VALE.	SPRING HILL.		CUMB. MIN'G Co.
		Round.	Small.	Coke.			Round.	Small.	
January		262	11			2313	8587		
February	79				66	825	6339		5
March	57	16	39	10	108	3010	8702		11
April	81	262	22		254	2826	7595	12	137
May	16		44		96	3363	9041		59
June		27	12	11		1055	8258		
July	37	1381	100			252	7379		
August	56	1464	201		15	285	8934		
September	34	1200	103				9320	56	
October		1615	111			168	7525	28	
November	17	1829	161	11	17	501	6837	15	17
December		2718	92		82	2028	8926	71	
	376	10774	896	32	638	16626	97443	182	229

T. V. COOKE,
General Storekeeper.

GENERAL STOREKEEPER'S OFFICE,
Moncton, N. B., Jan. 30, 1883.

From the following Stations:—

STATION.	QUANTITY.	
	1881.	1882.
Spring Hill.....	69246	84070
Stellarton.....	77799	108570
Drummond.....	69697	64258
Albion.....	808	20
New Glasgow.....	58354	58073
Maccan.....	2326	9880
Total.....	278230	324871

E. & O. E.

J. J. WALLACE,
Traffic Auditor.

MONCTON, N. B., 27th Jan. 1883.

FINANCIAL STATEMENT — GOLD.

Mines Department for Twelve Months ended December 31st, 1882.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	TOTALS.	Return Rents.	Return Royalty.	Royalty Commiss'n.	Salaries and Surveys.	TOTALS.
Caribou	270 00	305 07	575 07	.....	.....	17 60	.....	17 60
Fifteen Mile Stream	290 00	2 91	292 91	546 00	.....	.....	.....	546 00
Gay's River.....	38 00	.....	38 00	.....	.....	.....	5 00	5 00
Lawrencetown	48 00	5 45	53 45	.....	.....	.....	.....	.....
Montagu	24 00	137 56	161 56	.....	.....	8 50	.....	8 50
Oldham	336 00	188 54	524 54	.....	.....	5 09	26 00	31 09
Ovens	30 00	.....	30 00	.....	.....	.....	.....	.....
Renfrew	28 00	102 22	130 22	.....	.....	5 40	34 00	39 40
Sherbrooke	42 00	856 04	898 04	.....	.....	39 82	399 98	439 80
Stormont.....	202 00	181 27	383 27	.....	.....	.....	34 00	34 00
Tangier	951 00	66 31	1,017 31	46 00	.....	6 02	301 29	353 31
Uniacke	20 00	278 14	298 14	.....	.....	21 47	130 00	151 47
Wagamatkook	14 00	2 88	16 88	.....	.....	.....	.....	.....
Waverley	12 00	104 20	116 20	630 00	20 81	8 27	57 50	716 58
Wine Harbor	4 00	49 85	53 85	.....	.....	.....	.....	.....
Unproclaimed.....	14,48 00	336 97	1,784 97	204 00	333 36	.....	609 25	1,146 61
Prospecting Licenses .....	.....	.....	4,921 82	.....	.....	.....	.....	*84 98
	\$3,757 00	2,617 41	\$11,296 23	\$1,426 00	354 17	112 17	1,597 02	\$3,574 34

* Return.

OTHER THAN GOLD.

Mines Department, for twelve months ended Dec. 31st, 1882.

COUNTIES.	RECEIPTS.				EXPENDITURE.	
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Return Licenses to Search.	Totals.
Annapolis.....	\$ 120 00	\$	\$	\$ 120 00	\$	\$
Antigonish	360 00	.....	.....	360 00	.....	.....
Cape Breton	860 00	575 00	48882 56	50317 56	60 00	60 00
Colchester.....	420 00	150 00	.....	570 00	20 00	20 00
Cumberland	900 00	300 00	19330 47	20530 47	20 00	20 00
Digby	160 00	.....	.....	160 00	.....	.....
Guysborough..	200 00	100 00	.....	300 00	40 00	40 00
Halifax .....	.....	.....	.....	.....	40 00	40 00
Hants	140 00	.....	.....	140 00	40 00	40 00
Inverness	400 00	50 00	.....	450 00	100 00	100 00
Kings.....	20 00	.....	.....	20 00	.....	.....
Pictou	880 00	700 00	21010 08	22590 08	20 00	20 00
Richmond	240 00	50 00	.....	290 00	.....	.....
Victoria.....	380 00	.....	1225 17	1605 17	20 00	20 00
Yarmouth.....	100 00	.....	.....	100 00	.....	.....
Examinations.....	.....	.....	.....	60 00	.....	112 13
	\$ 5180 00	\$ 1925 00	\$ 90448 28	\$ 97613 28	\$ 360 00	\$ 472 13

ABSTRACT ACCOUNT.

Receipts and Expenditure for the Twelve Months ended 31st December, 1882.

RECEIPTS.	EXPENDITURE.
Licenses to search.....\$ 5,180.00	Return Licenses to Search.....\$ 360.00
“ “ work 1,925.00	Examinations 112.13
Royalty 90,448.28	
Examinations 60.00	\$ 472.13
	Return Rents 1,426.00
	Royalty 354.17
Rents 3,757.00	Royalty Commission 112.17
Royalty 2,617.41	Salaries and Surveys 1,597.02
Prospecting Licenses..... 4,921.82	Return Prospecting Licenses..... 84.98
	3,574.34
	General Expenses..... 5,803.29
	Postage..... 69.53
	Stationery and Printing..... 410.05
	6,282.87
	<u>\$10,329.34</u>

REPORT

OF THE

DEPARTMENT OF MINES

NOVA SCOTIA,

FOR THE YEAR 1883.



HALIFAX, N. S.:
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.

1884.

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DEPARTMENT OF MINES.

REPORT

FOR THE YEAR 1883.

*To His Honor MATTHEW H. RICHEY, Esq., Lieutenant-Governor of
the Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR:

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled by him from official and other returns made to the Department of Mines during the year 1883.

ALBERT GAYTON,
Commissioner of Public Works and Mines.

HALIFAX, February 20th, 1884.

REPORT

ON THE

MINES OF NOVA SCOTIA,

By EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.

INSPECTOR OF MINES.

(Member of the North of England Institute of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,
Halifax, February 20, 1884. }

THE HONORABLE

ALBERT GAYTON, M. P. P., M. E. C.,
Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following report on the mines of the Province worked during the year 1883.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1883, compared with that of the previous year:

		1882.	1883.
Gold	Ounces....	14,107	15,446
Iron Ore.....	Tons.	42,135	52,410
Manganese Ore	"	205	150
Copper Ore	"		60
*Coal Raised.....	"	1,365,811	1,422,553
†Gypsum	"	133,426	144,668
†Building Stone	"	4,357	181
Coke Made.....	"	26,731	44,189
†Grindstones, etc	"	2,450	155
Limestone	"	16,584	26,477

* Ton of 2240 lbs.

† Quantities shipped. Returns not completed. Amounts used in Nova Scotia unknown.

Through the kindness of the Collectors of Customs at the various ports of the Province I am enabled to give further details under this head at the end of the report.

In addition to a detailed notice of the operations of each mine and the usual statistical tables, I submit a summary of the amount of minerals exported, not paying royalty to your honourable Government.

I also beg leave to enclose the reports of W. Madden, Jr., Esq., who is Deputy Inspector of Mines for the district of Cumberland, Colchester and Pictou Counties, and of Patrick Neville, Esq., Deputy Inspector for the Island of Cape Breton.

These gentlemen were appointed on the 10th of May, and at once entered on their work. Since that date they have regularly visited the mines in their respective districts, and examined into all complaints, causes of accidents, etc. I have much pleasure in saying that they have discharged their duties in a highly satisfactory manner, and I believe that their visits are already causing a more careful compliance with the Mines Regulation Act, and greater attention to that important matter—ventilation.

COAL TRADE.

The total sales for the year 1883 amounted to 1,297,523 tons, against 1,250,179 tons in 1882, being an increase of 47,344 tons.

The following are the most noticeable points in the coal trade :

The home sales were 471,327 tons, compared with 458,952 tons during the preceding year.

The coal sent to the Province of Quebec amounted to 410,605 tons, against 383,031 tons in 1882, an increase of 27,574 tons.

The sales to New Brunswick show an increase of 14,123 tons.

The sales to Newfoundland decreased from 79,752 tons in 1882, to 61,678 tons during the past year.

The sales to Prince Edward Island show a decrease of 2,000 tons.

The sales to the United States were 102,755 tons, being an increase of 3,453 tons over the sales of the previous year.

The amount of coal sent to the West Indies increased from 22,386 tons in the year 1882 to 31,860 tons during the year 1883.

The sales to other points present no features of interest.

CUMBERLAND COUNTY.

The total sales of this County amounted to 222,347 tons, against 218,349 tons in 1882. The coal trade of this County presents no new features this year. The exports to Quebec were 46,483 tons, compared with 58,561 tons during the previous year. The sales to New Brunswick were 127,751 tons, compared with 113,435 tons in 1882. The sales in Nova Scotia were 43,731 tons, being 1,781 tons less than during the previous year.

The proposed extension of the coal shipping facilities at Parrsborough will, when completed allow of a considerable export trade to the United States. The position of Parrsborough to the Atlantic towns of the United States is favourable to such a trade, and the length of the shipping season will facilitate the execution of contracts. It is proposed to build a branch railway from Maccan, on the Intercolonial Railway, to the Joggins Mines, on a route following closely the northern outcrop of the seams of the coal field. This branch would accommodate several large settlements, and furnish a winter outlet for coal from the Joggins, Hebert, and other mines.

COLLIERIES.

BOSTON COAL MINING COMPANY.—In September Mr. Matthew Dunlop opened on the middle seam on the south side of the brook, about 50 feet above the seam formerly worked. The coal is about 2 feet 3 inches thick, and is said to be a good smith's coal.

CHIGNECTO.—During the year 1883 the levels were extended to a distance of 15 chains east and west of the slope. The balances next the slope are nearly worked out. The next ones are now in operation. The strip of coal beyond the second west balance is won by bords driven straight up from the level. In the bords the system of first working the lower coal, about 5 feet high, and then bringing back the top coal, has been adopted to save sending the stone to the surface. An engine is being put up in the west level to drive an exploring slope further to the dip. The records of the Scotia Mine are imperfect, but precautions are being taken to leave a good barrier of coal between the two mines. The output of the colliery was 23,395 tons, against 12,504 tons in 1882.

JOGGINS.—At this mine the workings in the old slope were continued until the end of the year, and in the future operations will be confined to the new slope. This slope has been driven down 1,300 feet, and the levels turned east and west for two balances on each side, which are ready for next year's shipments. The slope is one mile and two chains from the wharf. The waggons are sent down and back by an endless rope working over a Fowler clip pulley, driven by a small engine. The other arrangements at bank are of a permanent and convenient character, suitable for a much larger output than any yet recorded from this colliery. The output was 26,098 tons, against 20,178 tons in 1882.

MILNER.—During the summer Mr. M. Dunlop extended the level at this colliery, and sold 108 tons of coal.

MINUDIE.—At this colliery the slope has been sunk 325 feet, and the levels extended about 300 feet east and west. The coal is extracted on a long wall system, bords being driven to the rise and the pillars extended. The roads are protected by pack walls, until they become inconveniently long, when the lead is shortened by a new horse road.

The seam presents the following section:—

	ft.	in.
Top Coal.....	1	7
Fireclay	0	8
Bottom Coal	1	9
Total.....	4	0

At bank a screen has been erected, vertical hoisting engine, engine house, etc., and ten miner's houses. Steam is supplied to the winding engine and pump by two doubled flued boilers, each 15 feet by 3 feet. The tramway to the wharf on the River Hebert is one mile long, the waggons being moved by horses. The total outlay is returned at \$13,562.00. The produce was 4,451 tons.

SPRING HILL.—The operations at this mine, as referred to in my last report, have been continued vigorously and successfully. The slope on the north seam is fully equipped, and working satisfactorily.

The west slope bank head is being completely remodelled to form the main hoisting and pumping slope.

A mechanical ventilator, on a principle new to this Province, was built during the summer. The fan is 14 feet in diameter, with blades 6 feet long, and three feet six inches wide. It is driven by a belt from a special engine, and arranged to blow the air down instead of exhausting it as in the Guibal fan, the only mechanical ventilator yet used here.

The fan running at 60 revolutions gave 39,000 cubic feet of air; and 52,000 cubic feet at 79 revolutions. The cost per day of 24 hours, including interest and depreciation, may be estimated at \$4.50.

A slope has been driven on a seam of coal of good quality in the area, recently acquired, I understand, by this Company, from the Spring Hill and Parrsborough Railway Company.

The coal presents the following section :

	ft.	in.
Coal.....	2	0
Shale Parting	0	2
Coal.....	7	0
Shale Parting.....	0	4
Coal.....	1	0
Total.....	10	6

During the past season 193,161 tons of coal were raised.

SCOTIA.—A little work was done at this mine during the past year, and 589 tons of coal raised. The coal of this seam, when mixed with roof stone and moistened, ignites spontaneously. The workings on the brook ignited several years ago, and a similar result of neglect of the laws of nature is now taking place in the western extension of the mine. As there is on this area merely a strip of crop coal in this seam, it is regrettable that a lease was ever granted. The barrier already alluded to as necessarily provided between the Scotia and Chignecto workings contains more coal, which can never be removed, than this mine will in all probability ever produce. As the workings are extended along this crop coal they form a reservoir for water, and must prove a menace to future workings in lower sections of this seam.

Prospecting work was performed by Chas. Annand, Esq., on the area lying south of Spring Hill, and formerly known as the Sharp area, and a seam of excellent quality proved to dip to the south at an angle of 17°, and to present the following section :

	ft.	in.
Top Coal.....	1	0
Shaley Coal	1	0
Bottom Coal.....	3	10
Total.....	5	10

His explorations between this point and Spring Hill Village also proved a seam of coal 5 feet thick. This extension of the coal beds will allow of an increased development of the district, as they are conveniently situated with reference to both the Intercolonial and Parrsborough Railways.

A little prospecting was done north of the Scotia and Chignecto mines, and on the west side of the Maccan River, north of the bridge; but I am not aware of any results of importance.

PICTOU COUNTY.

The total sales last year were 461,809, against 446,137 tons during the year 1882. The home sales were 260,980 tons, an increase of 16,935 tons over those of 1882. The sales to Quebec were 145,527 tons, against 125,521 tons in the year 1882. The sales to New Brunswick remained about the same, as was also the case with regard to the trade with Newfoundland. The sales to Prince Edward Island (more than half of which are of slack coal) fell from 41,463 tons in 1882 to 38,622 tons during the past year. Similarly the sales to the United States fell from 24,970 in 1882 to 4,830 tons last year. The sales to other points are unimportant. The manufacture of coke for the blast furnaces at Londonderry was on a larger scale than before, as both furnaces were in blast.

ACADIA.—During the past year the system of bord work and pillar crawing adopted at this colliery has been regularly carried on. A battery of four Babcock boilers has been put up, and found to result in an economy of fuel and steam. Expensive, and sometimes fatal, accidents are caused by links of ropes, couplings, etc., breaking on the slopes, gangways, etc., of our mines. At this colliery all links are tested periodically to double the maximum strain they may be expected to sustain in the pit. This method of testing, although not necessarily a conclusive guide to the safety of the link at any given moment, provides, at a trifling cost, so satisfactory a protection, to the interests of the company and the workmen, that it should be adopted at all our collieries. Mr. Poole has introduced the Howe rocker grate under his boilers, with highly satisfactory results. A description of this rocker will be found further on in my report. The output of the colliery was 115,028 tons, against 105,569 tons in 1882.

ALBION MINES.—The regular operations in the Third seam have been continued during the year, and the slopes extended. At the McGregor pit the north slants have been extended to give a good winning. A new engine is being erected to haul from the south slants. A set of rollers has been put up to crush round coal for the coke ovens. The set of ovens at the McGregor are now working, and the total production of coke has been 25,536 tons, against 12,512 tons in 1882. The total amount of coal raised was 168,231 tons, against 141,090 tons in the year 1882.

A special report was made to you relative to the cause, extent and effect of the fire, which has existed for over thirteen years in the workings of the abandoned mines at this Colliery. I now give the following memo. on the subject. The Foster pit was sunk in the year 1866 to the main seam, near the face of the western workings of the Dalhousie pits, in the same seam. In May, 1870, a fire, of unknown origin, started in a stopping or wall between the workings of the new pit and of the Dalhousie pit. It being found impossible to put the fire out, the shaft and all openings likely to admit air were carefully closed. Owing to the great extent of coal worked near the crop of the main seam, complete exclusion of air was not attainable. The fire kept gradually eating its way toward the crop; and in the year 1872 its smoke was found in the workings of the underlying or deep seam, at a point where the removal of pillars had allowed the roof to break away up to the overlying seam, and necessitated building off part of the pit. The attempts hitherto made to exclude air from the fire were not allowed to relax, and all subsidences along the outcrops were carefully closed. The workings in the portion of the Dalhousie workings to the westward of the pit and next to the Foster pit, were carried about 35 feet high, the total thickness of the seam, and the pillars left merely large enough to secure the safety of the miners engaged in working. As the pillars and roof became weakened, a considerable district, next to the Foster pit, fell in and was crushed. This crushed district retarded the progress of the fire toward and along the crop of the main seam. About four years ago a portion of the Dalhousie workings, immediately east of this crushed district, fell so as to admit large volumes of air. Before the hole could be closed the presence of fire was discernable close to it. About two years ago a hole still further east also showed signs of heat before it was closed. In January of last year the weakening of the small pillars, already referred to, and of the shaley roof, became so general, that holes fell in at several points still further east. Owing to the difficulty of gathering earth, etc., in the depth of winter, to fill them with, the large volumes of air, unavoidably admitted, caused a rapid extension of the fire until flames issued at several points. After much trouble and expense these openings were finally closed, and at present the fire in these crop-workings is not increasing. As the ground at this part of the outcrop of the main seam is from 75 to 150 feet above the level of the East River, it will be seen that no successful attempt could be made to flood the coal immediately along the outcrop. I may add that the coal which has been burning would never have been mined, as it would not pay under any conditions of trade to re-enter these old workings with the small pillars and broken roof, as the danger and cost of mining would be very great. The fire under consideration has no connection with any of the numerous fires which have occurred at these mines since the date of their first opening, and which have been referred to in various reports.

INTERCOLONIAL.—The operations of the past season present few new features of interest. The No. 4 slope was worked until the fall. The levels in the main slopes were extended, and a regular extraction of coal maintained. In the new pit, connection has been made

with the air shaft, and inclines are being driven to the dip from the pit bottom. The bankhead screens, etc. have been completed. The No. 1 and 2 slopes were re-timbered and laid with new rails. The output of coal was 147,711 tons, against 150,486 tons raised in 1882. The returns show an expenditure of \$16,057, principally in machinery and colliery buildings.

VALE.—During the past year the extraction of pillars in the No. 3 lift has been satisfactorily completed. The No. 4 lift has also been extended for four balances on each side, and the pillar work commenced. The new winding engines are running satisfactorily. They are a pair of very handsome and substantial horizontal direct-acting engines, 30 inch cylinders, with five feet stroke, and a drum fourteen feet in diameter. Steam is supplied from four steel boilers, thirty feet long by five feet six inches in diameter, with two twenty-inch flues. The refuse coal, or “culm,” is used for steam raising.

The “six foot,” or Greener seam, is being opened by a slope which is now down about 350 feet. The dip of the seam at the crop is 28°, but it appears to flatten as it goes to the dip. It presents the following section :

	feet.	inch.
Coal	2	5
Slatey Band.....	0	1
Coal	0	7
Slatey Band.....	0	2
Coal	2	0
	<hr/> 5	<hr/> 10

The output of the colliery was 74,656 tons, against 92,808 tons in the previous year.

CAPE BRETON COUNTY.

The sales of coal from this County amounted to 612,614 tons, against 585,568 tons in the year 1882.

The home sales were 166,262 tons as compared with 169,327 tons during the previous year.

The sales to the Province of Quebec were 218,595, against 198,892, tons during the year 1882.

The sales to New Brunswick and Prince Edward Island remain at nearly the same figures as in the previous year.

There were 58,342 tons sent to Newfoundland, a decrease of 20,245 tons as compared with the export of the year 1882.

The exports to the West Indies were 30,781 tons, an increase of 8,400 tons over the amount sent during the preceding year.

The United States took 93,443 tons; of which 53,570 were slack coal, an increase of 20,000 tons over the amount sent the year before.

The sales to other points were inconsiderable.

COLLIERIES.

SYDNEY.—There are no new features connected with the underground workings which call for special reference. The face of the south side levels are now 85 chains from the pit bottom. The south side dip slants have been extended and the faces of the dip workings correspondingly advanced. The output was 162,866 tons against 156,758 tons in 1882. There were 110 tons of coke made.

VICTORIA.—The work of equipping and winning out this mine has been steadily continued. The centre slope has been driven 350 feet on a course due north, and at an angle of 24° . The east slope has been driven 237 feet on a course North $42\frac{1}{2}^{\circ}$ East, at an angle of $17\frac{1}{2}^{\circ}$. The west slope has been driven over four hundred feet at a similar dip, and on a course North $42\frac{1}{2}^{\circ}$ West. Necessary machinery and buildings are being erected, and the railway to the pier is completed. The returns show an expenditure of \$24,736.00.

LINGAN.—Operations have not been on a large scale at this colliery. The water which was allowed to accumulate in the sea area workings after the accident of 1873, was all taken out during the summer, and the levels, etc., put in order for resuming work. The output was 16,482 tons.

RESERVE.—This was an unusually brisk year at the Reserve Mines. Their sales were 110,456 tons, against 93,828 tons in the year 1882, and 76,727 tons in 1881. The work of the previous year was extended. A boiler and pump were placed in the main slope to save the necessity of carrying the steam over 2,000 feet. The extended scale of working necessitated attention to the ventilation, as will be seen by reference to Mr. Neville's report. During the year 1883 the company shipped 16,548 tons at Louisburg.

INTERNATIONAL.—At this mine the system of working hitherto in force has been regularly continued. The pit bottom has been lowered, and a road graded at a fall of $\frac{3}{8}$ of an inch to the yard to a point 35 chains from the pit. From this point a dip road has been driven to take the coal from the south-going bords. The old engine plane is utilized for drawing the north side coal. This division of the work will allow of an increase of the output, and minimise any delay from break downs below ground. A new pump has been set to pump from the dip face to the water level. The pit has been roofed in. About 60 tons of steel rails have been laid on the railway. The output was 99,018 tons, against 109,286 tons in the previous year.

LITTLE GLACE BAY.—Work has been regularly continued here during the past year. The wharf was strengthened, and the channel dredged. It is reported that preparations will be made to ship the coal from the Caledonia Mines at this harbor. A concentration of

the various shipping piers in this coal field is highly desirable, in view of the heavy and continued expenses caused by ice, worms, and shifting sand to the various artificial shipping places now maintained by the different companies. The output of the mine was 75,848 tons, against 70,186 tons in the year 1882.

CALEDONIA.—The extraction of pillars has been regularly continued, and an incline road 800 feet long, with clip pulley, driven, to deliver the rise coal from the west side at the pit bottom. The railway to Glace Bay harbour is in course of construction; it is reported with a view to shipping coal at that point. The output was 51,500 tons, against 59,893 tons during the preceding year.

ONTARIO.—During the past year there were few new features at this Colliery. A steady business was done during the summer, and the output was 22,038 tons, against 25,541 tons in the year 1882.

BLOCK HOUSE.—The extraction of pillars was continued during the summer, and the dips have been emptied of water. It is intended that during the winter as much coal as possible will be taken from some large blocks left in the centre of the basin.

A shaft has been set away to the west of the Long Beach road, to win the McAulay seam. It was sunk about 250 feet, when work was stopped until a new 50 horse-power sinking engine was put up. The sinking, which is not very wet, will be facilitated by the use of a Dean sinking pump. The output of this mine was 55,300 tons, against 61,753 tons in 1882, and an expenditure of \$7,100.00 returned.

GOWRIE.—Operations have been entirely confined to the new shaft winning. The levels have been extended to the north, and bords opened on the system in force at this colliery. The seam shows from 5 feet to 5 feet 6 inches of coal at the face. An incline has been made to run the rise coal to the pit bottom. The small tubs are being replaced by larger ones, holding about a ton of coal. The trials made of the Hadfield steel wheels under the tubs, has proved entirely satisfactory. They are lighter and more readily lubricated than the iron ones in ordinary use in the Province, and their durability is reported to be much greater. 73,290 tons were raised against 62,256 tons in the year 1882.

MISCELLANEOUS.

The Chimney Corner Mine was re-opened by Mr. Evans, and worked during part of the summer. A level was started on the beach, seven feet above high water mark, and driven in across the old slope for a distance of about 300 feet, and bords turned up to the rise. Repairs were made to the breakwater to allow of shipments being made.

Explorations were carried on at the Sydney Colliery, Little Pond, and a return made of an expenditure of \$2370.73.

Exploratory work was carried on in the vicinity of North Sydney by Messrs. Ingraham, Gannon and others. They report finding a seam of

good coal, four feet thick, outcropping 10 chains west of the Sydney Mines, No. 3 seam, on which they drove a short prospecting slope. They report another workable seam five feet thick, known as the Tully seam, lying 11 chains west of the last named seam.

In the Onslow district of Colchester County the explorations, referred to in my last report, have been continued on the DeBert and Chiganoise Rivers. The presence of several seams has been proved, and a seam on the DeBert River, about five feet thick, is being tested by a slope which is now down about 150 feet. The coal appears to be of excellent quality. Fuller information about this locality was given in a paper recently read by me before the Nova Scotia Institute of Natural Science.

Explorations were made for coal at New Germany, in Lunenburg County, but being in pre-carboniferous strata, the results were not encouraging. Discoveries of coal were reported from Fenwick, in Cumberland County, but no work was done to test its extent.

REPORT OF W. MADDEN, ESQ., DEPUTY INSPECTOR OF MINES.

WESTVILLE, PICTOU CO., Dec. 31, 1883.

The Hon. the Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following report, on my work, as Deputy Inspector of Mines, in the district of Pictou, Colchester and Cumberland.

VALE COLLIERY.—I visited this Colliery May 26, June 18, July 17, October 12, November 19, December 19. On each visit I travelled the working faces and airways, and found the ventilation good, a tabulated statement of which please find at the end of my report. During the past season a set of strong boxes were built for the conveyance of men up and down the slopes, and a new travelling road made to the outcrop between the fan and the slope. The tenderness of the roof at various points through the mine has necessitated special attention to timbering and a general careful supervision of the workings. The work of opening out a new mine on the six foot seam has been commenced.

ALBION MINES.—These works were inspected by me May 30, June 25, July 31, August 31, October 1, November 14, December 22. On my visits I found the air good, and the operations carried on in compliance with the law in the McGregor and Third Seam workings. During the past season a travelling road has been made from the outcrop to the MacGregor seam workings. Several accidents occurred at these mines, which, I presume, have been reported to you, and you are in possession of the results of my examinations into their causes

INTERCOLONIAL COLLIERY.—I visited these mines May 28, June 21, August 2, August 29, October 14, November 12, and December 28. The Intercolonial Company operated during the summer three slopes and a pit on the second seam, and toward the close of the season discontinued their work in the No. 4 slope and Second seam. During my visits I found the air good. The low levels in No. 2 slope, which are driven ahead to drain the coal, gave off a good deal of gas during part of the summer. In June a delay of a week was caused by the burning of the slope engine-house, which has just been replaced by a brick house with an iron roof. In September the area of the upcast shaft was enlarged and the ventilation thereby improved.

ACADIA COLLIERY.—I visited this mine May 23, June 20, July 30, August 27, October 5, November 19, December 29, and travelled the workings and air courses. The ventilation was good and carefully conducted. During the past season a new lift has been driven, and the operations have been continued in their usual systematic manner.

During the fall Mr. I. McNeil did a little work on the Lawson seam, on the Kirby area, with a view to mining coal.

DEBERT MINE.—I visited this mine on the 8th of December, and found an exploring slope being driven down on a seam of coal four feet three inches thick. The slope is about 150 ft. long, and the management intend putting up machinery to facilitate their operations.

SPRINGHILL MINES.—I visited these mines June 8, July 10, August 8, September 21, October 30, November 20, December 7, and found matters generally satisfactory. There has been a "blow down" fan put up, which has materially helped the ventilation. In the fall a little gas being noticed, a shot firer was appointed for the section of the mine in which the gas was reported. In November the machinery at the new slope was completed. An opening was made by the company on a new area, about one mile west of the present workings. This company have made a large outlay during the past season for machinery, engines, pumps, etc., with a view of still further enlarging their output.

CHIGNECTO MINE.—My visits to this mine were made June 11, July 13, August 10, September 20, October 29, and December 8, and the ventilation, timbering, etc., was found satisfactory. During the summer the ventilation was augmented by a steam jet placed in the upcast. The Bennet level still remains sealed up, and the fire has apparently died out. The fatal accident to D. Lockhart, on October 30th, was investigated by me, and arose from disobedience of orders.

SCOTIA MINE.—This mine was visited several times, and the operations were found to be on the usual small scale. The top coal of this seam has several times heated, and proved a source of trouble, notably last spring at the Bennett level. During the past season it was found necessary to build off a part of the goaf in this mine which had heated

MINUDIE MINE.—I visited this mine June 13, July 14, August 9, September 16, October 28, and found matters satisfactory. They have gradually got the colliery in working order, and their long wall system is fairly under way.

JOGGINS MINE.—I visited this mine June 12, July 9, August 8, September 18, October 28, December 4. On examination of the old slope workings, I found the return airways defective, owing to the fire-clay bottom. As the amount of air circulating would suffice with care, and the management did not intend working this slope after the end of the year, and the expense of thoroughly repairing them would be heavy no attempt was made at their permanent restoration. The new slopes have been driven down, levels turned away, and two balances driven. On July 11th, a miner named Charles Burke, sustained injuries from a fall of coal from the face, which resulted fatally. From my investigation it did not appear that any blame was to be attached to the officials.

Mr. Matthew Dunlop leased the Milner mine and worked it until August, when he moved to the Boston Company's area and worked on the south seam during the fall.

The above notes will convey an idea of the visits made by me during the past season. I presume you are in possession of returns of accidents, a tabular statement of which, so far as they have come under my notice, is appended. I also submit, in the form of a table, the amounts of air circulating at the various collieries.

I beg leave, in conclusion, to draw your attention to a point which I consider of importance. During the past season miners have repeatedly stuck their picks into the gauge of their safety lamps. The opening thus made by the pick reduces the safety lamp practically to an open or unprotected light, and might easily lead to a disastrous explosion if it occurred in a place becoming foul from inflammable gas. Several men have been fined for this by the Magistrates, and others have been punished by the Colliery officials, but the accidents still occur. The special rule bearing on the subject requires the safety lamp to be hung out of the reach of the pick as it is swung by the miner. I would suggest its being altered to read that the lamp be hung at least one foot beyond the extreme swing of the pick.

I have the honor to remain, Sir,

Your obedient servant,

W. MADDEN, JR.,
Deputy Inspector of Mines.

TABLE,

SHEWING THE QUANTITY OF AIR IN CUBIC FEET, PER MINUTE, CIRCULATED IN THE CUMBERLAND AND PICTOU COLLIERIES, DURING PART OF THE YEAR 1883.

COMPANY.	MINE.	JUNE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.	
Intercolonial Coal Co Drummond Mines. Westville.	Slopes No. 1 and 2 Slope No. 4. Shaft.	70000	70500	75000	80000	91200	94000	94000	
		10500	10500	11500	12500	13320	Idle.	Idle.	
		5000	6000	6000	8000	8500	Idle.	Idle.	
Halifax Coal Co'y. Stellarton.	McGregor.	North Side.	15960	15960	16000	16500	18560	18000	19000
		South Side.	13068	13068	15000	15500	16548	20000	21000
	Douglas.	Slope No. 1.	16275	17000	18250	19000	20000	20500	21000
		Slope No. 2.	18576	18000	18250	18500	18864	19250	19500
Acadia Col'ry, Westville	1 Slope.	65280	63000	64000	65000	66000	59000	60000	
Vale Colliery	1 Slope.	41000	45000	50000	55000	62800	65000	65500	
Spring Hill	3 Slopes.	55280	64000	64300	64750	65800	66100	66200	
Chignecto	1 Slope.	16000	18000	18255	18758	19052	19675	21000	
Minudie....	1 do.	5000	7000	7200	7360	7520	7850	.....
Scotia.....	1 do.	3000	3120	3155	3350	3670	3920	4125	
Joggins	1 do.	6520	6720	7025	7350	7859	8250	9000	

REPORT OF P. NEVILLE, ESQ., DEPUTY INSPECTOR OF MINES.

BRIDGEPORT, C. B., January 15, 1884.

The Hon. the Commissioner of Public Works and Mines:

SIR,—I beg leave to hand you the following report of my work as Deputy Inspector of Mines for Cape Breton.

SYDNEY MINES.—I have visited these mines seven times since my appointment in May last. Agreeably to the advice of the Inspector of Mines I have aimed particularly at acquainting myself with the systems of ventilation adopted at each mine. At this mine the ventilation seems to be well conducted around the face of the workings. The average amount of air entering the mine is 59,000 cubic feet per minute. This is split at the pit bottom, and again subdivided at the several sections of the mine, and all returns to the fan shaft, except a scale of 6,000 feet through the pumping shaft. Mr. Brown, the manager, has had the general and special rules distributed among the men, in order that they may familiarise themselves with its requirements. Three accidents, one fatal, happened at these mines. I enclose a table showing the number, causes, etc., of all accidents in the district.

VICTORIA.—The progress of completing this winning is being steadily carried on. At present the mine is aired by natural ventilation, but in a short time satisfactory arrangements will be completed for an efficient supply of air. An air shaft is sunk and connections made for placing a Champion ventilator. This will make the second mechanical ventilator in the Island, and I trust that at no distant day they will be found at every mine.

LINGAN.—At this colliery the air is admitted through the main slope and the water level, and after airing the faces is carried to the furnace, the average circulation being about 23,000 cubic feet.

INTERNATIONAL.—The supply of air enters from the drawing shaft, sea adit, and slope, it is split to air the dip and rise workings and returned to the furnace. On my first visit the air was somewhat dull in the south side workings, an extension and repair of the stoppings brought a satisfactory air up to the face of the bords.

RESERVE.—On my second visit I found the air dull at the face of the north side workings. The management made an improvement by enlarging the upcast and by building a cupola over it and by enlarging the airways. There are three inlets. The air going down the east slope ventilates the south side bords, joins the air entering by the French slope, airs the north side of the French slope workings, and returns to furnace. The air going down the north main slope splits, and after airing both sides of the slope, returns through the pump slope to upcast shaft on the north side, circulating about 9,000 cubic feet.

LITTLE GLACE BAY.—Sterling pit. I have visited this mine seven times. The ventilation in the colliery is by exhaust steam in the pump shaft; it was improved during the summer by enlarging the intake shaft, and by building a cupola over the upcast. The hoisting shaft has been enclosed up to the bank-head and air-tight doors put on.

CALEDONIA MINES.—The air at this colliery appears to be regularly managed, it enters from a slope and the adit, and after going round both sides of the pit, returns to the furnace. A complaint was made of the unsafe state of the travelling road. On examining into the matter, the underground manager stated that there was another road by which the men could travel; however, the road in question was retimbered and put in order.

ONTARIO MINES.—In this pit the air enters the mine by the main slope, is split to air both sides, and by means of an overcast is joined again and carried to the furnace. The air was a little dull at the face of the dip workings, this was remedied by stoppings across the front of the bords on the high side of the level. I was obliged to draw attention to the state of part of the travelling road, and it was repaired.

BLOCK HOUSE.—There is considerable difficulty experienced in airing this mine, for the taking out of the pillars under so thin a roof lets in air so as to materially interfere with any regular arrangement of ventilation. I would remark that the coal shipped from this pit, came almost entirely from the pillars, and was drawn without any accident.

GOWRIE MINES.—I have visited this mine seven times. In this mine I found the air carefully attended to. It enters near the crop and from thence passes through a well secured air course to the new workings, and after passing the faces returns by the levels to the upcast.

CHIMNEY CORNER.—I visited this mine in the fall, and cannot give much information about it, as work had ceased and level was obstructed by debris.

In conclusion I would draw your attention to a practice which I consider very dangerous. I allude to the use of iron needles and tin castors. The custom is for the miner to put the powder into the back of the hole by throwing it in by means of the castor, then to stem 6 to 18 inches of clay or slack after it. When this is done the needle is driven by a maul to the back of the charge. I believe that greater safety would be secured to the miners if the use of copper needles and copper or zinc castors were made compulsory. I would also recommend the extension of special rules throughout the district, and believe that it would be found beneficial to all concerned if more pains were taken to distribute the mining regulations among the men.

I enclose herewith a table of accidents, and a table showing the number of my visits and the average amount of air circulating at each mine.

I have the honor to remain

Your obed. servant,

P. NEVILLE,

Deputy Inspector of Mines.

Table showing number of visits paid, and average circulation of air in Cape Breton pits.

Name of Mine.	No. of Visits.	Average amt. of air during working hours.	
Sydney Mines.....	7.....	59,000	Cubic feet per minute.
Victoria ".....	4.....	7,000	" "
Lingan ".....	8.....	23,000	" "
International Mine..	8.....	24,000	" "
Reserve Mine.....	8.....	26,000	" "
Little Glace Bay Mine	7.....	23,000	" "
Caledonia Mine.....	7.....	25,000	" "
Ontario ".....	7.....	17,000	" "
Block House Mine..	7.....	22,000	" "
Gowrie Mine.....	7.....	25,000	" "
Chimney Corner....	1.....		

GOLD MINING.

The increase in the yield of gold during the past year, although not as large as during the year before, is still of a satisfactory character. The total yield of gold for the year 1883 was 15,446 oz., 9 dwts., 23 grns.; being, with the exception of the year 1877, the largest return since the year 1871, when a production of 19,227 ounces was recorded.

There were 25,954 tons of quartz, etc., crushed, which gave an average yield of 10 dwts. 21 grns. per ton crushed. This is the lowest yield, per ton, since the year 1869. As it is understood that, generally speaking, the year's operations have proved satisfactory from a financial point of view, it would appear that increased attention has been given to economy in mining and milling.

The lowest yield per ton was in the Sherbrooke district, where 8,470 tons yielded 3,356 oz. 18 dwts., an average of 7 dwts. 22 grns. A considerable portion of this was from low grade ores, which ran from 4 to 6 dwts. per ton. The experiments on low grade ores, as carried out at Mount Uniacke and Sherbrooke, show that with plant of the proper extent and with proper business economy in mining management and milling, this grade of material can be treated with satisfactory results.

The richest returns during the past year were made by the districts of Stormont and Chezetcook. The former district is worked by the Gallagher Gold Mining Company, which extracted 1,917 ozs. from 551 tons of quartz. The Chezetcook district, where the Oxford Gold Mining Company are at present almost the only operators, returned 2,494 ozs. 5 dwts. from 1,475 tons of quartz, an average yield of 1 oz. 13 dwts. and 10 grns.

The returns of unproclaimed and other districts were not as large as usual last year, owing to the proclamation of the district of Darr's Hill (Salmon River) which has hitherto figured under this head.

The total number of days' labor was 97,703. This probably represents fairly the work performed in connection with mining operations, and is a little less than last year.

DISTRICTS.

CARIBOU.—The returns for the past year show a falling off in the amount of gold extracted, from 588 to 477 ounces, but the amount milled was considerably larger, being 2094 tons, against 1601 tons in the year 1882. During the fall Mr. Caffrey re-opened his mine in the Jennings district, but after a short time stopped work. Mr. Touquoy worked for some time on a cross lead, and sunk 32 feet on it.

At Moose River the operations of the Moose River Gold Mining Company were suspended, and the various leads let to tributors, who worked on the North, Comstock, and other lodes. Mr. Touquoy did some work on the Little North Lead, sinking two shafts, to the west of the Moose River Company's area. Mr. Henry Archibald did some prospecting at the west end of the district.

DARR'S HILL.—This locality, commonly known for some time as Salmon River, was made a proclaimed gold district in June last. Hitherto its returns have been published among those of unproclaimed and other districts. The returns show 18,120 days' labour, 7,602 tons of quartz crushed, and 3,885 ounces of gold. The total returns from this mine since it was opened, up to the close of the year 1883 are 9,726 oz. 7 dwts., from 12,574 tons of quartz, a gross return of about \$200,000. The main vein worked varies in thickness up to 6 feet. The main shaft is about 100 feet deep and stopes have been carried over 400 feet on each side of it. The ore is carried on a tramway about one half a mile to the mill, and about 20 stamps are kept continually running. Mr. Hattie did some work on the west shore of Eagle Lake on a south dipping lode, 2 to 4 inches thick, and prospected other lodes.

FIFTEEN MILE STREAM.—During the past year little was done on the Hall-Anderson property. In the fall Mr. R. G. McDonald extracted quartz from the Orion belt. Mr. Hudson continued testing the eastward extension of the Hall-Anderson lodes with satisfactory results, and on area 29 Block 3 he opened a belt giving three feet 6 inches of crushing material, which gave promising results on crushing.

On lease No. 41 Mr. J. S. Mackay opened the Nonpareil lode, and took out quartz for a trial crush. Prospecting was also carried on by Mr. Grant and others.

GAY'S RIVER.—Mr. Parker did a little work and collected a few dollars worth of gold, but was prevented from doing much by want of a crusher.

MONTAGU.—Work in this district was almost at a standstill during the past year. Messrs. Symonds did a little work on their property, and other parties prospected in the Eastern part of the ground. In the fall a promising lead was opened by the Bluenose Gold Mining Company,

who have built a mill and put up the engine, pump, etc., necessary to thoroughly test it. Mr. Hale has rebuilt the concentrating mill which was burned down fall before last, and after some experimenting with a set of Embrey concentrators, considers the problem of re-working Nova Scotia quartz tailings to be practically solved.

OLDHAM.—This district presents few new points of interest. Mr. Baker worked his cross vein in the spring, and some work was done on the adjoining Donaldson properties. During the summer tribute work was done on the Fraser property, and on the old Donaldson areas, and west of the Britannia area. The returns show 999 ozs. of gold against 411 ozs. in the year 1882.

RENFREW.—The operations carried on by Dr. Rae were stopped in the spring. Subsequently Mr. A. A. Hayward, manager of the Empress Gold Mining Company, opened on the eastern extension of the Preeper lode. A shaft has been sunk 100 feet, and levels driven to cut two lodes, 12 and 9 inches thick, lying a short distance south. The work has been systematically laid out, and as the main lode averages from 2 to 3 feet, it should yield well when the *pay* of the lode is cut by the new workings. The engine house is well fitted with hoisting gear, etc., and a Blake air compressor, to drive three drills. The Ophir mill has been repaired, and crushing was to begin at the close of the year.

SHERBROOKE.—The returns show 8,470 tons of quartz, etc., crushed for a yield of 3,356 ozs., 18 dwts., 17 grns., being an average of 7 dwts., 22 grns., against 6,251 tons, yielding 2,542 ozs., 17 dwts., an average of 8 dwts., 3 grns., during the year 1882. As the returns of this, the most important district in the Province, have, for several years shown a continued decrease, it is gratifying to find indications of a return of prosperity. The principal operations were on the Pactolus, where the belt was extensively worked. On the Rockville two shafts were sunk on some small leads, in about one foot of slate. Mr. Hamilton worked on the Meridian, taking out a belt about 7 feet wide. During the preceding year this property gave 3,300 tons of mill stuff, yielding at the rate of 6 dwts. and 3 grns., and the results were satisfactory, although the work was carried on in a small way.

On the Hayden and Derby a shaft was sunk 200 feet, and stopes carried on a vein from 2 to 4 inches thick. It was found necessary to keep back the water from adjoining workings by means of a dam.

Some work was also done on the Cleverdon property and in the areas lying north of the Hayden and Derby.

At Cochran's Hill, the Halifax and Boston Gold Company put up an engine and pump on the west end of the property, and during the summer they did some work on the same leads near their east line.

STORMONT.—In this district scarcely any work has been done, except by the Gallagher Gold Mining Company. Their returns for the past

year were 7,520 days labour, 551 tons of quartz, and 1,917 ounces of gold, an average of 3 oz. 18 dwts. The total yield of the mine up to the end of the year 1883 was 2,822 ounces, from 1,065 tons of quartz. The operations referred to in my last report have been steadily continued, and present no new features.

At Country Harbor Narrows the Messrs. Mason did some prospecting on a slate belt carrying several leads showing gold.

TANGIER—The returns for this district last year were 1,140 tons yielding 798 ounces. Mining has been confined principally to Strawberry Hill, where the Brunswick Company were at work. The mill has been completely overhauled, and new mine buildings erected. The principal operations were on the Forrest lode in the vicinity of the Mooseland road.

At Mooseland a few tons of quartz were crushed.

UNIACKE.—This district gave 1,197 ounces from 2,809 tons of quartz, etc., an average of 8 dwts. 12 grns. The chief work was done by Mr. Blois, who worked for some time in a lead near the pond, and afterwards in the slate belt of the Montreal property. Mr. Prince worked in the Uniacke area, and re-opened the nugget lode in its eastern extension.

Mr. Davidson continued his mine by driving north and taking out some quartz rolls, and then driving south where two good leads were found and opened on the top. Mr. Madill worked west of the Davidson area, and Mr. D. Brown did some work on the Prince of Wales area.

WINE HARBOR.—This district gave no returns, Mr. May having transferred his operations to Sherbrooke.

UNPROCLAIMED AND OTHER DISTRICTS.

CHEZZETCOOK.—The Oxford Gold Mining Company have worked steadily during the past season. Their lead varied in thickness up to 15 inches. The paystreak dipped at a heavy angle to the east.

An adjoining lode was opened and found to warrant working. A very good mill of ten stamps has been running during the year. The returns show a yield of 2,494 ozs. from 1,475 tons of quartz. The total returns from this mine since the start to the end of the year 1883 being 3591 oz. from 2086 tons of mill stuff. Preparations are being made to build a mill on an adjoining property known as the Cambridge, where some promising leads have been opened.

At Yarmouth, in the spring, tests were made of the Chegoggin measures, and in the fall it was reported that the lead had been found which was considered to have furnished the surface gold over a considerable tract of country.

A five ton sample from the Lochaber mine gave $2\frac{1}{4}$ ozs. of gold.

At Bridgewater, Lunenburg county, on Leipsigate Lake, a rich cross lead was found by Mr. Owen, it turned in a slate belt and, at the time of my visit, the slate belt carried three leads from 2 to 4 inches thick, in three feet of slate. A considerable amount of gold has been taken out by hand. Messrs. Hall & Owen found a promising lode on the north side of the lake, which averaged about 20 inches of mill stuff and showed gold over a distance of 600 feet. Were a mill put up I see no reason why this district should not prove a very remunerative one.

INDIAN PATH.—Preparations are being made for resuming work on the large lode, and a little prospecting was done at the Ovens.

COPPER.

During the past summer the Coxheath Copper Mining Company did a great deal of work at their mine near Sydney, Cape Breton. Their levels were extended and a good deal of ore stoped out. A few tons of this were handpicked and sent away for testing. Experiments were made on the low grade ores, and it is stated that preparations are being made for the erection of a large concentration plant in the spring. Some of the copper was found to carry 80 oz. of silver to the ton.

At Margaretville, in Annapolis County, some work was done in the vicinity of the old mine, opened on a vein carrying native copper, etc., in the trap.

Discoveries of copper were reported from Pleasant Valley, Yarmouth Co., Pomquet Forks, Antigonishe Co., and Scottsburn, River John, and Malagash, in Pictou and Colchester Counties.

IRON.

During the year 1883 the operations of the Steel Company of Canada were carried on vigorously, and 52,410 tons of ore taken out, and 7,672 tons of ankerite quarried for a flux.

Some prospecting was done by Mr. Jas. McKay, Battery Hill, Pictou County, on veins of specular ore. The thickest vein opened was said to be 7 feet wide and of good quality. In the Indian Reserve near St. Peters, Cape Breton, Mr. Joseph Matheson reported finding several lodes of specular ore.

LEAD, SILVER, ETC.

Some exploration was made by Mr. J. McLean on a lead ore, carrying silver and gold, found between Cheticamp and Cape Lawrence. A few barrels full of Bismuth glance and Molybdenite were shipped from Gabarus to the United States.

Mr. Howard Clarke continued prospecting on his silver lead property at Smithfield, and has shown that there is a very large amount of available ore.

ANTIMONY.—In my report on the mines and minerals of Nova Scotia, published in the year 1880, I alluded to the probability of the ores of Antimony being discovered in workable quantities in this Province. During the fall a vein of this ore was found near East Rawdon. The ore is reported to be of excellent quality, and to be present in workable amounts. A large sample has been mined and shipped to Swansea.

OIL.—Boreholes were started for the purpose of testing lands near Pictou, where signs of the presence of oil deposits have for some time been noticed.

GYPSUM.—The exports reached 144,668 tons, an increase of 11,242 tons over the production of the preceding year.

MANGANESE

Mr. J. W. Stephens continued working his mine at Tenny Cape, and his brother also did some work at Tenny Cape and at Walton. Some prospecting was done at the latter place by Mr. Stevens and others, and at Onslow by Mr. Pendergast and others.

At Loch Lomond, in Cape Breton, Mr. Moseley continued working his mines. Further information on the Manganese ores of Cape Breton was given in a paper recently read by me before the Nova Scotia Institute of Natural Science.

ACCIDENTS.

During the year 1883 the following fatal accidents occurred :

1. February 17.—Chignecto Mines, John Hudson, W. Patton and I. Burrows—suffocated by carbonic oxide.
2. February 28.—G. Flinn, miner, Vale Colliery—killed by fall of coal.
3. March 9.—D. Bailie, incline boy, Albion Mines—killed by run-away rake.
4. April 13.—J. McKay, incline boy, Intercolonial Colliery—killed by fracture of pinion wheel.
5. May 3.—A. Fraser, Jas. Gillies, W. Hannahan, W. McGilvray, Jas. McEachran, Colin Campbell, John Nicholson, Vale Colliery—killed by breaking of drawbar on trolley on which they were riding in slope.
6. May 23.—John Davison, miner, Stormont—killed by fall from tub in shaft.
7. June 13. H. Rude, miner, Stormont—killed by blast.
8. July 11.—Chas. Burke, miner, Joggins Mines—killed by fall of coal.
9. Sept. 26.—G. Murphy, Tangier—fell down shaft.
10. October 13.—Angus Keigan, driver, Sydney Mines—run over by coal tub.
11. October 30.—Dan. Lockhart, incline boy, Chignecto Mines—killed by cage going off track.
12. December 20.—W. Fletcher, incline boy, Spring Hill—killed by fracture of brake bolt.

I would remark, in reference to the above—

(1.) The accident at the Chignecto Mine occurred in the Bennet level. In these workings the top coal had fallen and ignited spontaneously. The day before, the fire had been, as it was supposed, securely built off, and the working reported safe. It was a level driven ahead of the main workings, to drain the surface water, and only a pair of cutters were employed. The ventilation was natural, and had hitherto been found ample. The air entering the level,

escaped at a small shaft near the face. The evening before the accident a holing for a travelling road from the main workings had been made into the level, near its mouth. This holing had not been closed, as at night-fall the ventilation appeared satisfactory, the holing casting up into the level, and the air going to its face. During the night the air reversed. In the morning, the underground manager, Mr. Patrick, who had some days before relieved the night watchman, whose duty it was to examine this level before the men went in, from doing this work, went in with the two miners. He returned and informed Mr. Baird, the manager, that, in his opinion, it was too foul for the men to continue working. He was instructed to return to close the holing referred to above, and the manager followed in a few moments to see if this step had purified the air. The miners, finding the place unfit to work in, instead of escaping by the air shaft, a few yards from their working place, attempted to return by the level, and were overcome by the stythe. Brave attempts were made to rescue them, and they were finally got out, with Mr. Patrick, who had also been overcome. Unfortunately, Mr. Burrows, one of the rescuing party, lost his life. Mr. Patrick was revived, but over-exerting himself in his weak state the following day, he was attacked by inflammation of the lungs, which shortly after proved fatal. Had Mr. Patrick, the underground manager, either gone in first himself, or sent some competent person, to examine the level before the entrance of the men, as required by the Mines Regulation Act, the accident would not have occurred.

In the case of D. Bailie, who was killed in the north slant of the McGregor pit, by the breaking of a coupling chain, which allowed a box to enter the landing where he was standing, it may be remarked that he had no business at the point where he was injured, and had left his post. The chain which broke was an English-made cage chain, specially tested and warranted considerably in excess of the actual load. On examination it was found to have parted at the weld. In this connection I would refer you to my remarks, under the head "Acadia Colliery," on chain testing.

The death of J. McKay, at the Intercolonial Colliery, brings up a point which, I am afraid, is not always remembered by those having charge of colliery engines. The pinion wheel of the little underground engine used in sinking the slopes broke, and the rake running back crushed the boy, who appeared unnecessarily to have been walking right behind the rake. The gradual distress and final rupture of pinion wheels, seems to be a question of usage, and after a certain time they become unsafe, and should be replaced by fresh castings. The judgment of the colliery engineer will frequently afford information, but under ordinary colliery usage, five years should not pass without renewal of such pieces.

The accident, No. 5, at the Vale Colliery, resulting in the death of eight persons, and the injuring of three others, was one of an unusually distressing character. The men, who had been engaged at various duties, started on a long wood car to ascend the slope. The

orders are that the bottomer put on a durkey whenever men ride in the coal boxes; he was riding himself, and not thinking it necessary, omitted to put on the durkey. When the car had gone a short distance the draw-bar broke, and as it ran back, there being no durkey, the men were thrown off, the bottomer himself being a sufferer. The draw-bar, on examination, proved to have an old flaw on one side of the bolt eye, and to have parted rapidly on the other side, presumably from the effect of some unnoticed severe cross strain or twist recently inflicted on it. The total tensile strength of the draw-bar, not considering the half rendered valueless by the old flaw, was 25.3 tons, for the quality of iron used. The load on the rope was 1.7 tons. At this colliery the tubs are regularly examined and over-hauled, and this car had been inspected by the head carpenter a few days before. The jury, after a prolonged investigation, conducted by Dr. Murray, coroner, of New Glasgow, exonerated the management, and recommended that special tubs be made for the men to ride in, and that the inspection of the boxes be carried still further. As slope riding is more dangerous than shaft riding, it is as well to have the men walk; in this mine, however, the great depth and heavy angle would be too much for them after a day's work. The idea of providing special boxes where men ride in slopes, has since been adopted at other collieries, and is worthy of imitation under similar conditions.

(7.) In the case of this accident, the man who fired the shot had not obeyed the rules of the mine to post himself, so as to give warning after lighting the fuse, consequently Rude was caught by the explosion on his way past and killed. The man who fired the shot left the locality at once.

(9.) The evidence in this accident appeared to show that the deceased had hold of the rope, and was last seen leaning over the shaft to talk to the sinkers below.

(10.) In this case the deceased undertook, in the absence of the regular driver, to take a box into one of the deeps by walking down in front of it; the box proved unmanageable, and knocking him down, crushed his head.

(11.) This accident occurred through disobedience to orders.

(12.) This accident was caused by fracture of the holding down bolt of the brake in a back balance wheel, and the handle of the lever flying up and striking the boy on the head.

As a large percentage of the preceding accidents were due to breakage of machinery, iron, etc., it would be well for colliery managers to consider if the unusual activity of the coal trade during the past few years has not led to a more rapid wear and deterioration of mining plant than was formerly the case.

Among the non fatal accidents may be mentioned two slight cases of burning by gas at the Albion Mines,—one due to disobedience of orders, and the other to carelessness.

Six accidents attended the use of powder. One at the International

arose apparently from the use of an iron stemmer; three at the Albion mines from unexpected ignition of shot. One accident arose from a man trimming his lamp over his powder can.

Several fractures of limbs were caused by falls of coal and roof. Two men were injured at the Sydney mines by the in-going rake. They had neglected to use the safety holes, and even then would have been safe had they stepped to the other side of the road where there was ample space. The slack box at the Springhill mine which travels up the rotary screen gangway, got off the track and fell a distance of some 30 feet, striking a man named Michael Burke. He wonderfully escaped without serious injury.

MISCELLANEOUS.

The following is a list of the men who have received certificates from the Board of examiners:—

CERTIFICATES OF COMPETENCY—UNDERGROUND MANAGERS.

Thomas Scott.....	Springhill.
Henry Swift.....	"
Thomas Routledge.....	Sydney.
Hugh Campbell.....	Cow Bay.
James Baird.....	Chignecto.
J. G. S. Hudson.....	Stellarton.
James Maxwell.....	Westville.
Alex. McInnis.....	Springhill.
W. Campbell.....	Stellarton.

OVERMEN.

Alex. McDonald.....	Stellarton.
James Rogers.....	"
George Wilson.....	Chignecto.
A. L. Edmunds.....	Cow Bay.
Ed. Wilkinson.....	Stellarton.
John Weir.....	"
W. Reese.....	Springhill.
M. Dunlap.....	Chignecto.
Francis Burrows.....	"
W. Lorimer.....	"
Allan C. McKinnon.....	Springhill.
John Maxwell.....	Stellarton.
Allan Caldwell.....	Sydney Mines.

CERTIFICATES OF SERVICE—UNDERGROUND MANAGERS.

John Dunbar.....	Stellarton.
R. Redpath.....	Minudie.
R. Wilson.....	North Sydney.
W. Conway.....	Spring Hill.

Henry Morley	Cow Bay.
John Johnstone.....	Bridgeport.
John Douglas	Stellarton.
Thomas Turnbull	Vale Colliery.
George Scott.....	Caledonia.
James Simpson.....	Sydney Mines.
W. McNamara	Lingan.
P. P. Burke	Joggins.
A. L. Anderson.....	Cow Bay.
W. Adamson.....	Glace Bay.

OVERMEN.

William Young.....	Lingan.
Angus McKeigan.....	Bridgeport.
George Kay	Sydney Mines.
J. B. Greenwell.....	"
John McKay.....	Stellarton.
Thomas Johnston.....	Cow Bay.
T. Fletcher	Reserve.
James Johnstone	Westville.
Ed. Harris.....	"
J. Bradley.....	Spring Hill.
Mat. Spoors	Vale Colliery.
W. Stafford.....	N. W. Territory.

I may remark that the answers of the candidates showed a very gratifying improvement. It is, however, apparent that in order to develop fully the opportunities offered, there should be a chance given to intending candidates to acquire the theoretical knowledge, which renders their practical skill more readily available both to anticipate and to overcome the unusual and unexpected difficulties which often confront the miner. So thoroughly has the necessity for a training in the principles which form the ground work of practice been recognised on the continent, that at some of the larger industrial works the proprietors themselves have opened schools where their workmen can receive technical training. The results of such schools have invariably been an increase in the quantity and quality of the work turned out, and a growth of good feeling between masters and men, which in some cases has practically banished strikes.

At some of our collieries the officials have given assistance to those among their men who have desired to improve themselves, but very much more could be done. Instruction in surveying, measuring, laying off work, etc., can be given without much trouble, and gradually there grows up in a colliery a class of men who are anxious to give and receive information, and who take a pride in facilitating the operations of the mine, a state of affairs which cannot but prove beneficial.

It is true that text-books supply all the information which too often the miner applies imperfectly, and from his individual and limited experience. Few men, even with the advantages of early

training and leisure, can acquire by their own reading a satisfactory knowledge of any professional subject, and the difficulties in the way of our candidates are much greater, as in our mining districts educational facilities are of a limited nature.

I would suggest, the matter is one well worth your consideration, and that the present school system could be utilized as a basis for providing lectures on chemistry, pneumatics, hydraulics, etc., to meet the needs of proposing candidates, and that courses of special lectures on mining matters could be arranged.

NON-CONDUCTING PIPE COVERING.

At a recent meeting of the American Society of Mining Engineers, Mr. Leavitt, consulting engineer of the Calumet and Hecla Mining Company, during a discussion on the use of non-conducting coverings for steam pipes, stated that at their mines five hundred feet of 8 inch pipes were used to carry steam from the boilers to the engines. The condensation amounted to several hundred gallons a minute when they were simply boxed up. On covering the pipes with a mixture of plaster and sawdust the condensation was reduced to less than one per cent. of what it was previously. The mixture is made by taking one part by volume of plaster of paris and two parts of sawdust, and is applied to the boilers or pipes in the state of mortar. When dry a layer of hair felting $1\frac{1}{2}$ inches thick is put outside of it. The effect of this may be judged of from the fact that at the Calumet and Hecla mines, where the temperature frequently runs below zero during the winter, there is no appreciable difference between the amounts of fuel used under the boilers during the winter and the summer months, when the covering is applied in the manner referred to above.

HOWE CULM GRATE.

I also referred to the satisfactory tests made of the Howe Culm Grate at the Acadia Colliery, and give the following brief description of it, which will serve to show its peculiarities:—

“The Howe culm grate consists of the ordinary grate-bars, cast with holes through them, through which rods are passed carrying knife-edged rockers, which are connected together and are rocked by means of a lever in front of the furnace. The grate-bars, spaces and rockers are made equal in width, and the bars are preferably made full length of furnace, and divided up so that the rockers are arranged to break joints, which prevents the fire being left in ridges. Among the advantages claimed for this new grate are these: That culm, small-sized anthracite, and bituminous coal can be successfully burned and thoroughly cleaned on it, and make as much steam as large size coal; that it can be cleaned in two minutes without the use of the poker, and without the loss of steam, as the doors are opened only when feeding the fire; that it breaks up clinker and cinder by means of the knife-edged rockers, and forces them through the grate; that it has nearly sixty per cent. air space, which insures good combustion; and that, as the bars are of simple construction, they are not likely to get out of order.”—*Am. Mining Journal*.

BOILER INSPECTION.

The report of the Hartford Steam Boiler Insurance Company always presents many points interesting to those who have charge of boilers. From a study of the defects and dangers found by their inspectors, the colliery engineer may frequently guard more effectually against common defects, and have his attention turned to sources of danger possibly hitherto overlooked.

From their annual report for the year 1882 we learn that 33,690 defects were reported to boiler owners, of which 6867 were considered dangerous and requiring immediate attention. The following detailed statement shows the various defects.

Nature of defects.	Whole number.	Dangerous.
Cases of deposit of sediment.....	3,138	467
Cases of incrustation and scale.....	4,913	450
Cases of internal grooving.....	237	112
Cases of internal corrosion.....	1,210	232
Cases of external corrosion.....	1,803	437
Broken and loose braces and stays.....	613	293
Defective settings.....	935	158
Furnaces out of shape.....	1,030	204
Fractured plates.....	1,801	902
Burned plates.....	1,084	412
Blistered plates.....	2,853	385
Cases of defective riveting.....	4,807	535
Defective heads.....	386	149
Serious leakage around tubes.....	3,414	845
Serious leakage at seams.....	1,957	342
Defective water-gauges.....	640	146
Defective blow-out apparatus.....	290	118
Cases of low water.....	131	84
Safety-valves overloaded.....	358	136
Safety-valves defective in construction...	238	99
Defective pressure-gauges.....	1,808	344
Boilers without pressure-gauges.....	43	14
Defective feed-pipe.....	1	1
Dangerous defects unclassified by inspectors ..	..	2
Total.....	33,690	6,867

BAROMETER.

The last volume of the Transactions of the North of England Institute of Mining Engineers contains a valuable contribution by Mr. V. W. Corbett on Water-gauge Barometer, and other observations taken at Seaham Colliery during the time the Maudlin seam was sealed up.

The terrible explosion at Seaham Colliery on the 8th September, 1880, causing the death of 164 men and boys, will be fresh in the minds of all colliery managers. After the pit was re-opened, the workings in the Maudlin seam were found to be on fire at some temporary

stables. They were cut off by stoppings in which water-gauges were placed, provision being also made to prevent damage to the stoppings by any undue accumulation of gas. Barometers were placed at these stoppings and at bank. A gas check was provided in another district of the pit where there was a large goaf, opening out into the workings. The check consisted of a level about 50 yards long leading from the return airway to the goaf and kept open.

The water-gauges and barometers were observed and recorded for about six months. The gas check was also observed by a man noting regularly the distance from the goaf at which gas was found in the level, thus furnishing a record of the effects produced on the goaf gas by atmospheric changes of pressure. The recorded readings of the numerous instruments employed in this investigation form a very interesting paper, which cannot be reproduced here, and the summaries arrived at may prove suggestive to our colliery managers.

The writer remarks: "The first comparison between the water-gauge and the barometer permits the following deductions to be made:—1. The extreme sensitiveness of the water-gauge in marking every fluctuation of the atmospheric pressure on the gases in the sealed up workings. 2. The great tardiness of the barometer in recognizing these fluctuations."

It is apparent from the water-gauge diagram that fluctuations of gases in colliery workings must be occurring almost every hour. These frequent fluctuations seem to be clearly defined by the water-gauge whenever they take place, but they are not correspondingly recognized by the barometer, and it appears that the barometer only recognizes what may be termed general or clearly defined great fluctuations, and even then very slowly. In several instances when the water-gauge has shown an inbye pressure prevailing, and the pressure having reached its limit, an outbye pressure commences, indicating that gas has commenced coming off, it is found that the barometer still continues to mark an upward tendency.

The fourth comparison between the barometer and gas check clearly indicates the unreliableness of the barometer. In a few cases the barometer is seen to act before gas is found in the gas check, but generally it is not a true indicator to mark the giving off of gas; and it is well known that gas is frequently found in colliery workings before any fall of the barometer commences. It may be urged that frequently the gas check and barometer work together,—and this is true to some extent; at the same time, however, the water gauge proves during part of this time that the pressure was out-bye, whilst, had the barometer alone been consulted, an in-bye pressure would have been indicated. In fact, the barometer, so far as an indication showing that gas may be expected, cannot be said to be reliable. Unlike the readings of the water gauge, those of the barometer, showing absence of gas, are so widely different that it is impossible to assume any general rule as to when the pressure of gas may be expected.

One lesson suggested by the water-gauge, barometer, and gas check readings is, that as an instrument for the use of all connected with colliery operations, the water-gauge may be found preferable to the barometer; and that if a water-gauge is connected with a sealed up working, its readings indicate nearly accurately the giving off or otherwise of gas in a colliery, which the barometer fails to do.

If the above system of ascertaining when gas may be given off in mines can be further substantiated, and put into actual use at collieries, it will doubtless prove of much greater service than placing too much reliance on an instrument, so uncertain in its action in indicating gas as the barometer.

The question of the extent of the reliance to be placed on the barometer as a gas warner in coal mines has received much attention of late years. In my report for the year 1880 I referred to the subject, and pointed out that even a superficial consideration of the matter showed that the number of points on which it could warn was not as numerous as had been claimed.

The summary of Mr. Corbett's paper, given above, throws some light on this important subject, and it appears that the first step must be the construction and study of a barometer many times more sensitive than the mercurial balance. It would next appear important to have the subject of the effect of atmospheric pressure on the strata of the earth, and the effect of the passage through coal mining districts of seismic vibrations carefully examined. Should investigations in this direction prove that the varying pressures of the atmosphere are coupled with other forces in the exudation and accumulation of gas, we may hope that, instead of pinning our faith on an ordinary mercurial barometer, warnings may be given from a central point where the causes above and below ground could be worked out for general cautionary signals.

IRON STEMMERS, ETC.

Mr. Neville, in his report, alludes to the dangers attending the use of iron needles, stemmers and tin castors. In England for some years these tools have been made of copper, and the powder put up in cartridges. It is, however, well known that perfect safety is not secured by the use of the softer metal, and accidents have been caused by it in our own mines. Phosphor bronze is said to be safer than copper; and recently a still softer metal has been tried with success. It is hardly to be hoped that with the common system of charging holes complete immunity from accident can be secured, as two particles of pyrites or hard-stone when violently driven together, not unfrequently give off sparks. There have been so many accidents from sparks falling into powder cans, etc., in our coal mines, that it would almost appear necessary to have some system introduced of carrying the powder to the working places, and charging the holes, without its being exposed to risks of premature ignition. Should the new metal, now being experimented with, prove successful, an effort should be made to compel the use of implements which can in any way prevent this painful class of accidents.

SAFETY COUPLINGS.

The following plan may often be advantageously adopted as a safeguard in the case of the couplings between any two boxes, or between the leading box and the rope, breaking when the rake is ascending. It consists of a chain passing under all the boxes and fastened to the rope. The use of "durkeys" is not always to be relied on as a sure stopper of loose boxes, as unless long enough to get a proper hold the boxes sometimes override; and they cause annoyance at bankheads and elsewhere if for any reason it is necessary to stop the rake, as they frequently lift one or two boxes off the track. It is true that most breakages occur with an ascending rope, but those which happen with a descending rope are more difficult to meet. An arrangement on the following principle might be found effectual in the case of the breakages just alluded to when the rake is descending. The durkey on the leading box being made to turn on a pivot, the up end being attached by a light chain to the rope, and tightened to lift the point clear, then any breakage snapping the chain the point of the durkey would fall to the floor. Both of these arrangements would be useless in the case of a breakage in the rope itself.

THE FEEDING AND MANAGEMENT OF COLLIERY HORSES.

The subject has been very fully treated in a paper read before the Newcastle Mining Institute by Mr. Charles Hunting. Some of his views may not quite accord with the experience of this country, but the following outline of his paper will serve to bring the matter before those having charge of colliery horses, and to suggest several points of interest.

The age of horses bought for pit use should be between five and seven years. The practice of taking a new horse and sending him at once into the pit is open to serious objections. The horse is generally out of condition, and in such cases is more liable to accident and disease than if he had been properly fed and worked, first at bank for a few weeks. There is also the risk of introducing disease among the pit horses.

In order that the most effective results may be got from pit horses, it is indispensable that they be regularly worked and kept in good condition. Usually this is attained by work and plenty of good oats and hay, but experience has shown that equally good results can be got at a cost less than that usually incurred for animals doing light work.

High Feeding is economical under these conditions.

1. The selection of the cheapest but best food.
2. Giving that food in the form most favorable to digestion.
3. The prevention of waste.

Food may be defined as the material supplied to build up or replace the tissues of the body, which consists of nitro-genous, fatty

and saline compounds. These two leading compounds, nitro-genous and fatty matters, which are found in all animal and vegetable bodies, are the most important in relation to horse-feeding. The flesh or muscle being derived from the nitro-genous constituent of vegetables, such as oats, barley, beans, etc., and the maintenance of animal heat being due to the fatty and starchy constituents of the food.

The following table, therefore, shows the value of various foods for providing the chief requirements of the animal under consideration:

	Water.	Woody Fibre.	Starch, Gum, Sugar and Fat.	Nitro-genous matter.	Ash or Saline.
Beans or Peas	14.5	10.0	46.0	26.0	3.5
Barley	13.2	13.7	56.8	13.0	3.3
Oats	11.8	20.8	52.0	12.5	3.0
Maize	13.5	5.0	67.8	12.29	1.24
Hay	14.0	34.0	43.0	5.0	5.0
Carrots	85.7	3.0	9.0	1.5	.08

The evidence of this table is shown by the practical success of the Banting system, the inadequacy of hay alone to support working horses, and the success attending the uses of beans and peas as a soldier's food for meeting the waste of muscular tissue during a campaign. The figures in the table require, however, physiological knowledge, showing that woody fibre is indigestible, and that a certain bulk of food is required for proper digestion, and that some foods such as linseed, maize, bran, cause laxity of the bowels, while others tend to produce constipation.

When these various foods and their comparative cost are considered the following points are apparent: First, for moderate work, where cost is not an item to be considered, hay and oats form an excellent food. When, however, hard work is required from the horse, no single grain can alone preserve both health and condition. The fact is either the chemical or physiological action is defective, and it is only by mixing foods and altering their nutritive value, that a food can be produced to supply all the requirements of the body without deranging its functions. When, therefore, the chemical, physiological, and money values of foods are known, the best and cheapest food can be selected, that is to say, that mixture of foods which gives the largest amount of feeding material at the lowest possible cost.

The writer gives the following instance of the insufficiency of hay and oats alone to maintain proper condition under the heavy loads and long hours imposed frequently on pit horses.

At a colliery in Durham the output decreased from the inability of the horses to get the work out, as they were all very much run

down. The feed allowed consisted of 168 lbs. of oats and 154 lbs. of hay per week, the oats not being crushed and the hay not being chopped. The horses were comparatively large animals, none being under 16 hands.

Their food was changed to

	S.	D.
Crushed Peas, 35 lbs. @ 34s. per qtr.....	2	4
“ Barley, 20 lbs. @ 28s. “	1	3
“ Oats, 40 lbs. @ 28s. “	3	4
Bran, 14 lbs. @ 7½d. per stone.....		7½
Hay, 7 stones @ 9d. per stone	5	3
	12	9½

The old plan being :

Oats, 168 lbs. @ 28s. per quart	14
Hay, 11 stones @ 9d. per stone.....	8 3
	£1 2 5

This shows a saving of 9s. 5½d. per week per horse, and the digestive organs of each horse had 115 lbs. less of food to digest. Within three months the horses were doing their full quota of work with ease. As there were 149 horses in the colliery there was an annual saving of £3,664 effected.

The attendance on the horses is frequently not marked by the care and thoughtfulness due to the services of so valuable an animal. At most mines it has become a maxim that a man who is past other work is particularly fitted to take charge of horses. Such a man is sometimes required to attend to thirty or forty horses, when to give the attention necessary for proper cleaning, grooming, watering, etc., half that number is an outside allowance.

The following table of cost, etc., of Australian milling is interesting for comparison with Nova Scotia experience :

TABLE SHOWING WEIGHT OF STAMPS, &c., USED IN AUSTRALIAN GOLD MINING.

Name of District.	Weight of Stamps.	Cost per stamp.	Fall of Stamp.	Strokes per minute.	Quartz per Stamp per 24 hours.	Holes in Grating per sq. inch.	Horse power to work each Stamp.	Water used per Stamp per hour.	Mercury in ripples per Stamp.	Mercury lost per S. pr wk.
	cwts.	£ s. d.	inches		tons. cwts.			Gals.	Lbs.	Ozs.
Ballarat.....	3-9	12s.-£1	7-14	50-83	1.4-3.17	75-256	7/10-1½	24-770	2-32	½-22
Beechworth.	3-13	16s.-£3	5-20	40-90	1-2.15	80-260	¾-2½	40-120	9-56	½-4
Sandhurst	6-8	14s.-£1.10	6-12	60-65	1-2.10	80-200	1	255	6-36	1
Maryboro'.....	5-8	14s.-£1.12	7-12	60-76	1.8-2.14	81-290	1-1½	320-900	2-20	1-12
Castlemaine.....	6-8	14s.-£1.12	7-12	60-75	1/10-2	81-200	½-1	240-660	4-20	½-18
Ararat	6-9	£1.2-1.12	6-10	70-75	1.1-2.10	120-342	½-1½	528-800	20-75	6-29
Gippsland.....	1-8	£1.2-£5	6-40	18-80	16-2.16	602-40	1-2	60-480	5-38	½-10

The following papers relating to the Geology and Mineralogy of Nova Scotia have been read during the year:

E. GILPIN.—The Folding of the Carboniferous in Nova Scotia. Royal Society of Canada.

E. GILPIN.—An Analysis of a Pictou Coal Seam. N. S. Institute of Natural Science.

C. HOFFMAN.—Canadian Geological Survey, Mineralogical Report.

DR. HONEYMAN.—Geology of Hants and Colchester Counties. N. S. Institute of Natural Science.

Polariscopic Examination of Crystalline Rocks from Yarmouth: *ibid.*

Glacial Transportation in Nova Scotia: *ibid.*

I have the honor to be, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,
Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	LESSEE.	DISTRICT.	Area. Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, Sarah, and others .....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C, et al.....	Tatamagouche.....	10½
CAPE BRETON COUNTY.			
104	McKenzie, H. R., and others.....	.....	1
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others .....	.....	1
LEAD.			
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River.....	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James.....	East River.....	1
43	Hudson, James.....	"	1
CAPE BRETON COUNTY.			
86	Brookman, Phœbe	N. Side East Bay	1
91	C. L. Ingraham.....	East Bay	1
Total area under lease.....			square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No	LESSEE.	DISTRICT.	Area Sq. Miles.
	IRON.—Continued.		
	CAPE BRETON COUNTY.—(Continued.)		
102	C. L. Ingraham.....	East Bay.....	1
103	J. A. McKenzie.....	".....	1
92	Matheson, D., et al.....	".....	1
93	Brookman, S. J., et al.....	".....	1
84	Protheroe, Pryse.....	Cow Bay.....	1
	INVERNESS COUNTY.		
16	Inverness C. I. & R. Co.....	Whycocomagh.....	1
	Total area under lease.....		25½ square miles.

43	Pugwash & Sp'ng H'l R. Co.	.....	1	.....	R. Redpath	River Herbert.
16	Seaman, Gilbert.....	.....	1	.....	
24	Shannon, S. L.....	.....	2	.....	
36, 39	Shannon, S. L. (in trust) et al	.....	2	.....	
6, 7, 8	Spring Hill Mining Co...	Spring Hill	3	Working.	William Hall...	Spring Hill.
52	" " " "	" " " "	4	"	"	"
22, 23, 28, 29, 30	Styles Mining Co. (Ltd).	.....	5	.....	J. S. Hickman...	Amherst.
9	Victoria Coal Mining Co..	.....	2	.....	
26, 27	Wright, John V.....	.....	3	.....	
		PICTOU CO.	66			
1	Acadia Coal Co.....	Fraser	1	Working.	{ H. S. Poole.....	Stellarton.
3	" " " "	Acadia	1	"	{ J. Maxwell.....	Westville.
42	" " " "	Pictou	4	.....	{ J. B. Moore.....	New Glasgow.
23	Allan, Sir Hugh, K't.....	Vale	3	Working.	{ John Greenen..	Vale Colliery.
10	Gray, B. G.....	.....	1	.....	
11	Halliburton, R. G., et al..	.....	1	.....	
13, 14	Halifax Co'y, (Lt'd).....	Albion	4	Working.	{ S. Cunard & Co	Halifax.
	Intercolonial Co'y.....	.....	2	Working.	{ J. Rutherford..	Stellarton.
12	" " " "	.....	1	Working.	Robert Simpson..	Westville.
6	Kirby, Lewis R.....	Drummond	1	.....	
15, 30, 31	Merigomish Co'y.....	.....	3	.....	
25	Nova Scotia Co'y.....	Black Diamond..	4	.....	M. H. Angell....	Westville.
20	Price, D. E., et al.....	.....	2	.....	
24	Richey, M. H.....	.....	1	.....	
			29			

10, 21	Gibson, John, et al	.....	.....	2			
4, 12, 16	Glace Bay Mining Co....	Glace Bay	.....	3	Working.	{ E. P. Archbold. Chas. Rigby...	Halifax. Lit. Glace Bay.
75	Henry, W. A.....	.....	.....	1			
22	Ingraham, R. J. and J. L..	Halfway	.....	1			
6, 13, 18, 19	International C. & R. Co..	International	.....	4	Working.	{ R. Belloni..... P. Johnstone...	Cow Bay. Bridgeport.
71	Jennings, Edward	.....	.....	1			
47	LeCras & McInnes	.....	.....	1			
66	Merchants' Bank of Canada	Gardener	.....	2			
74	Moore & Moseley	.....	.....	1 $\frac{1}{2}$			
81	Morton, Lemuel J.	.....	.....	1			
80	McDonald, James	.....	.....	1			
101	McDonald, W. B.	.....	.....	1			
52, 53	McLeod, Hugh	.....	.....	2			
88, 89, 90	Paint, Henry N., and others	.....	.....	3			
83, 85	Protheroe, Pryse	.....	.....	2			
73, 82	Reid, Thos. S. (<i>sea area</i>)..	.....	.....	2			
40, 41, 42	Ross, H. E., et al	.....	.....	3			
79	Ross, W. J., et al (<i>sea area</i>)	.....	.....	1			
43	South Head Coal Co....	South Head	.....	1			
32	Sword, Wm. (<i>sea area</i>)....	.....	.....	3			
54 to 62	Sydney C. M. Co. (<i>sea areas</i>)	.....	.....	10			
46	Todd, A. Thorton	Collins	.....	1			
67	Weatherbe & Kirby	.....	.....	1			
78	Weatherbe, R. L. (<i>sea area</i>)	.....	.....	5			
34, 35, 36	Victoria C. M. C. (<i>sea area</i>)	Victoria	.....	5			
50, 51	"	.....	.....	2	Working	D. Lynk.....	Low Point.
				131 $\frac{3}{4}$			

LIST OF COAL LEASES — (CONTINUED).

No.	LESSEE.	COLLIERY.	Area Sq. Miles.	WORKING.	AGENT AND <i>Manager</i> .	POSTAL ADDRESS.
		INVERNESS CO.				
5	Aylmer, John Evans Freke..	Cape Mabou	2	Working.	Thos. Evans..... Alex. Wright.....	Moncton.
8	Evans, Thomas	Chimney Corner..	1			
9	Evans, Thomas (<i>sea area</i>)...	.....	1		
7, 12	Inverness C. I. & R. C. ....	.....	2		
13	Murray, George	Port Hood.....	3			
4	Richey, M. H. et al. ....	.....	1		
11	Ross, W. J.	Broad Cove.....	1			
6	Ross, H. E. et al, (<i>sea area</i>)..	.....	1		
14, 15	Smyth, Peter .....	.....	2		
10	Tremaine, E. D., (<i>sea area</i>)..	.....	1		
17	McDonald, Hugh .....	.....	1		
		RICHMOND CO.	16			
2	Marmaud, A. E.....	Little River.....	1			
		VICTORIA CO.	1			
2	Campbell, Chas. J.....	New Campbellton.	3		John McDonald ..	New Campbellton.
3, 4, 5	Ross, William	Black Rock.....	5			
			8			
Total area under lease.....		255½ square miles.			

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	59,342	49,198	113,114	78,565	80,781	14,231	.....	.....	253,237	141,994
2nd Quarter	66,039	58,644	127,373	116,756	176,269	149,753	.....	.....	369,681	325,153
3rd Quarter	56,808	55,213	148,605	156,602	250,665	287,098	.....	.....	456,078	498,913
4th Quarter	65,672	59,292	116,534	109,886	160,578	161,532	773	753	343,557	331,463
Total	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179
1881	183,419	171,149	372,197	346,968	568,509	516,852	245	45	1,124,270	1,035,014
1880	143,085	134,671	461,811	434,922	422,884	380,848	4,930	4,218	1,032,710	954,659

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.		GRAND TOTAL.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia											
Land Sales...	23,140	16,262	110,547	103,492	2,019	3,801	5	.....	135,711	123,555	259,266
Sea borne.....	4,265	64	38,913	8,028	152,832	7,610	349	.....	196,359	15,702	212,061
Total Nova Scotia...	27,405	16,326	149,460	111,520	154,851	11,411	354	.....	332,070	139,257	471,327
Quebec.....	43,582	2,901	143,568	1,959	216,720	1,875	.....	.....	403,870	6,735	410,605
New Brunswick...	80,710	47,041	5,553	1,849	32,497	30	60	.....	118,820	48,920	167,740
Newfoundland...	.....	.....	3,336	.....	57,983	359	.....	.....	61,319	359	61,678
P. E. Island.....	.....	.....	15,155	23,467	7,407	1,720	273	66	22,835	25,253	48,088
West Indies.....	.....	.....	1,079	.....	30,617	164	.....	.....	31,696	164	31,860
United States.....	756	3,626	1,708	3,122	39,973	53,570	.....	.....	42,437	60,318	102,755
Other Countries...	.....	.....	.....	33	3,371	66	.....	.....	3,371	99	3,470
Total.....	152,453	69,894	319,859	141,950	543,419	69,195	687	66	1,016,418	281,105	1,297,523
1882... ..	151,281	67,068	329,350	116,787	522,325	63,245	125	.....	1,003,079	247,100	1,250,179
1881... ..	127,756	49,413	257,573	89,395	446,649	70,203	45	.....	826,003	209,011	1,035,014
1880... ..	99,491	35,180	326,870	108,052	346,103	34,745	4,218	.....	776,681	177,977	954,659

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1883.	Year 1882.
Nova Scotia.						
Land Sales.	71,168	61,259	52,034	74,805	259,266	238,828
Sea borne..	4,831	50,467	78,623	78,140	212,061	220,124
N. Scotia—Tl	75,999	111,726	130,657	152,945	471,327	458,952
Quebec.....	28,522	120,596	214,572	46,915	410,605	383,031
N. Brunswick	30,617	42,170	49,322	45,631	167,740	153,617
Newf'd.....	1,372	9,890	22,105	28,311	61,678	79,732
P. E. Island..	57	11,922	23,587	12,522	48,088	50,096
United States	3,552	23,047	46,917	29,239	102,755	99,302
West Indies..	1,875	5,597	11,266	13,122	31,860	22,386
S'th America..	.....	205	487	2,778	3,470	1,462
Europe.....	.....	.....	.....	.....	.....	1,601
Total....	141,994	325,153	498,913	331,463	1,297,523	1,250,179
1882..	121,898	256,987	494,038	377,256	1,250,179	1,250,179
1881..	94,219	246,475	396,612	297,708	1,035,014	1,035,014

COAL.—GENERAL STATEMENT.

1883.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	253,237	141,994	31,451
2nd Quarter.....“	369,681	325,153	26,213
3rd Quarter.....“	456,078	498,913	24,192
4th Quarter.....“	343,557	331,463	30,093
Total.....	1,422,553	1,297,523	111,949
1882.....	1,365,811	1,250,179	111,381
1881.....	1,124,270	1,035,114	107,888
1880.....	1,032,710	954,659	96,831

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31st, 1883.

COLLIERIES.	PRODUCE.	SALES.				COLLIERY CONSUMPTION.		
		Paying Royalty.	Free.	Total.	Per Cent.	Engines.	Workmen.	Per Cent.
CUMBERLAND COUNTY.								
Chignecto	23,395	15,889	2,730	18,619	77	1,961	341	9
Joggins	26,098	16,618	4,651	21,269	81	2,815	417	12
Lawrence	59	50	50	100	...	.....	6	...
Milner	108	108	.....	108	...	.....	.....	...
Minudie	4,451	3,355	526	3,881	87	477	108	...
Spring Hill.....	193,161	115,857	61,816	177,673	92	10,670	3,342	10
Scotia	589	576	121	697	...	.....	.....	...
PICTOU COUNTY.								
Acadia	115,028	69,532	37,082	106,614	92	6,813	1,916	7
Albion Mines	168,231	89,386	59,399	148,785	88	8,585	3,711	7
Intercolonial...	147,711	103,214	34,353	137,567	93	6,795	2,949	6
Vale	74,656	57,727	11,116	68,843	92	6,899	1,260	10
CAPE BRETON COUNTY.								
Block House...	55,300	51,777	14	51,791	93	2,981	1,558	8
Caledonia	51,500	39,314	12,243	51,557	100	1,430	888	4
Glance Bay	75,848	70,118	2,559	72,677	95	2,551	1,688	5
Gowrie	73,290	55,659	14,884	70,548	96	1,201	1,038	3
International...	99,018	83,252	13,745	96,997	97	1,500	1,294	3
Lingan.....	16,482	12,818	100	12,918	78	2,200	854	2
Ontario	22,038	18,796	726	19,522	88	1,155	474	7
Reserve	110,456	89,581	15,196	104,777	94	3,571	3,980	6
Sydney Mines	162,866	121,968	9,705	131,673	88	16,002	7,595	10
Victoria ...	1,495	136	18	154	...	470	454	...
VICTORIA COUNTY.								
New Campbellton...	773	687	66	753	....	.....	.....	....
INVERNESS COUNTY.								
Chimney Corner	1,422,553	1,016,418	281,105	1,297,523	....	78,076	23,873	....

Statement of the Numbers and Classes of Persons employed, and average results at each Colliery, during the year ended December 31st, 1885.

COLLIERIES.	UNDERGROUND.				SURFACE.			CONSTRUCTION.		TOTAL.		AVERAGE NO. OF DAYS PER PERSON.		Average quantity raised per day, tons.	HORSES.		PITS WORKED.	
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Mechanics.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Under ground.	Above ground.	Average No. of Tons per Cutter.		Average Tons per day per Cutter.	Above.		Below.
CUMBERLAND.																		
Chignecto	41	10	13	14,880	8	20	7	9,712	99	24,592	230	277	570	2.6	5	2	217	
Joggins	54	23	8	23,512	10	30	3	10,348	130	34,608	276	240	483	1.7	6	6	271	
Lawrence	4	1	...	62	4	...	2	52	11	114	...	...	...	...	1	...	90
Milner	14	3	1	3,474	5	9	1	3,164	38	7,553	192	210	318	1.2	1	...	261	
Minudie	196	99	74	106,675	38	77	15	37,759	508	147,135	289	290	985	3.4	5	18	289	
Spring Hill.....	9	4	...	732	2	...	...	142	15	874	...	...	...	...	1	...	60
Scotia																		
PICTOU Co.																		
Acadia	88	81	24	51,093	22	44	7	21,715	266	72,808	295	297	1,307	4.6	6	6	278	
Albion	226	102	57	90,678	81	141	37	66,821	644	157,499	235	257	880	3.3	12	16	262	
Intercolonial	162	72	82	76,843	33	69	11	33,328	440	113,321	243	294	910	3.2	10	13	283	
Vale	148	37	14	47,236	43	52	5	34,988	299	82,234	237	349	504	2.3	5	15	217	
CAPE BRETON Co.																		
Block House	62	7	34	19,981	23	39	6	18,308	192	43,237	185	268	891	4.8	14	23	183	
Caledonia.....	74	9	21	17,479	16	37	9	13,628	163	32,660	168	262	695	4.7	6	14	147	
Glouce Bay	125	9	18	23,672	23	29	3	15,591	208	39,635	155	247	606	3.0	7	7	197	
Gowrie.....	94	13	34	30,674	19	41	12	18,333	213	49,007	233	254	779	3.7	8	20	206	
International	107	24	49	48,185	32	84	2	28,748	299	77,068	267	243	925	4.5	6	36	182	
Lingan.....	30	5	9	10,010	2	25	17	7,454	88	17,464	227	169	549	2.1	3	5	260	
Ontario	46	4	7	8,953	7	14	7	5,530	85	14,483	157	194	479	3.2	8	4	149	
Reserve	147	18	35	34,305	25	27	9	14,634	262	49,164	171	240	751	3.2	4	17	235	
Sydney	246	36	83	85,300	61	105	39	58,134	570	143,434	233	283	662	2.6	13	36	247	
Victoria	17	6	...	5,582	5	29	3	9,983	82	21,255	242	270	...	...	4	...	301
INVERNESS Co.																		
Chimney Corner ...	8	2	...	1,189	1	3	...	592	14	1,781	118	148	...	...	...	1	100
VICTORIA Co.																		
New Campbellton ...	6	...	...	165	1	2	...	46	9	211	...	...	...	...	1	...	...
Total	1904	565	563	699,780	461	867	195	409,020	80	2,337	4635	230	262	748	96	241	226	

COLLIERY CONSTRUCTION ACCOUNT — 1883.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Build-ings.	Dwel-ings.	Surface Works.	Rail-ways.	Wharves.	Prospect-ing.	TOTAL.
CUMBERLAND Co.	\$										
Chignecto.....			835 00			195 00	300 00			100 00	1430 00
Joggins.....			4600 00	2600 00	400 00						7600 00
Lawrence.....											
Milner.....	11 00	60 00	13 00	7 00				45 00	7 00	900	152 00
Minudie.....		2411 00	1126 00	2500 00	1000 00	1600 00	1150 00	3475 00	300 00		13562 00
Spring Hill.....		2539 00		24498 00	650 00	1669 00	1620 00	184 00			31160 00
Scotia.....	200 00		202 00					38 00			440 00
PICTOU Co.											
Acadia.....											
Albion.....				18 00	28 00		40017 00				40063 00
Intercolonial.....	1200 00	2874 00		5329 00	6147 00			507 00			16057 00
Vale.....		2190 00	2695 00	8507 00							13392 00
CAPE BRETON Co.											
Block House.....	7100 00										7100 00
Caledonia.....			688 00			350 00		857 00	1600 00		3495 00
Glance Bay.....			109 00	246 00					600 00		955 00
Gowrie.....			1333 00								1333 00
International.....					1702 00						1702 00
Lingan.....			484 00								484 00
Ontario.....			906 00			189 00	325 00				1420 00
Reserve.....	100 00		2527 00			2000 00					4627 00
Sydney Mines.....											
Victoria.....		6364 00	3721 00	1465 00	1264 00	220 00	915 00	6225 00	4562 00		24736 00
VICTORIA Co.											
New Campbellton.....											250 00*
INVERNESS Co.											
Chimney Corner.....			600 00			150 00	150 00	250 00	200 00		1350 00
Total.....	\$8611 00	16438 00	19839 00	45170 00	11191 00	6373 00	44477 00	11581 00	7269 00	109 00	171308 00

*Repairs.

Nova Scotia Coal Sales, from 1875 to 1883 (inclusive).

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1831	37,170	Forw'd 368,196
1786	2,000		1832	50,396	
1787	10,681		1833	64,743	
1788			1834	50,813	
1789			1835	56,434	
1790			1836	107,593	
1791	2,670	1837	118,942	839,981	
1792	2,143	1838	106,730		
1793	1,926	1839	145,962		
1794	4,405	1840	101,198		
1795	5,320	1841	148,298		
1796	5,249	1842	129,708		
1797	6,039	1843	105,161		
1798	5,948	1844	108,482		
1799	8,947	1845	150,674		
1800	8,401	1846	147,506		
		1847	201,650	1,533,798	
1801	5,775	1848	187,643		
1802	7,769	1849	174,592		
1803	6,601	1850	180,084		
1804	5,976	1851	153,499		
1805	10,130	1852	189,076		
1806	4,938	1853	217,426		
1807	5,119	1854	234,312		
1808	6,616	1855	238,215		
1809	8,919	1856	253,492		
1810	8,609	1857	294,198	2,399,829	
1811	8,516	1858	226,725		
1812	9,570	1859	270,293		
1813	9,744	1860	322,593		
1814	9,866	1861	326,429		
1815	9,336	1862	395,637		
1816	8,619	1863	429,351		
1817	9,284	1864	576,935		
1818	7,920	1865	635,586		
1819	8,692	1866	558,520		
1820	9,980	1867	471,185	4,927,339	
1821	11,388	1868	453,624		
1822	7,512	1869	511,795		
1823	27,000	1870	568,277		
1824		1871	596,418		
1825		1872	785,914		
1826	12,600	1873	881,106		
1827	12,149	1874	749,127		
1828	20,967	1875	706,795		
1829	21,935	1876	634,207		
1830	27,269	1877	697,065		
		1878	693,511	7,377,428	
		1879	688,628		
		1880	954,659		
		1881	1,035,014		
		1882	1,250,179		3,582,716
		1883	1,297,523		
			Total.....		21,029,287

SUMMARY.

1785 to 1790.....	14,349	1841 to 1850.....	1,533,798
1791 " 1800.....	51,048	1851 " 1860.....	2,399,829
1801 " 1810.....	70,452	1861 " 1870.....	4,927,339
1811 " 1820.....	91,527	1871 " 1880.....	7,377,428
1821 " 1830.....	140,820		
1831 " 1840.....	839,981		

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1867	338,492	\$1.25
1851	116,274	"	1868	228,132	"
1852	87,542	"	1869	257,485	"
1853	120,764	"	1870	168,180	"
1854	139,125	Free.	1871	165,431	"
1855	103,222	"	1872	154,092	.75
1856	126,152	"	1873	264,760	"
1857	123,335	"	1874	138,335	"
1858	186,743	"	1875	89,746	"
1859	122,720	"	1876	71,634	"
1860	149,289	"	1877	118,216	"
1861	204,457	"	1878	88,495	"
1862	192,612	"	1879	51,641	"
1863	282,775	"	1880	123,423	"
1864	347,594	"	1881	113,728	"
1865	465,194	"	1882	99,302	"
1866	404,252	"	1883	102,755	

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT

MONTH.	CARRIBOU.							DARR'S HILL.							FIFTEEN MILE STREAM.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	405	16	330	80	5	0	2	1927	77	815	703	3	5	2	144	6	.....	..	..	..
February	2	512	20	338	52	17	19	2	1665	66	641	401	7	3	1	131	5	.....	..	..	..
March	2	315	12	224	63	5	0	2	1821	72	676	400	5	11	1	90	4	.....	..	..	..
April	2	132	4	513	83	7	19	2	1648	66	545	336	16	..	1	75	3	50	43	11	14
May	2	175	6	.....	..	..	..	2	1506	60	557	334	10	..	1	167	6	.....	..	..	..
June.....	3	200	8	10	2	5	0	2	1758	70	598	280	18	..	1	172	7	.....	..	..	..
July.....	3	236	9	.....	..	..	..	1	1360	54	675	290	..	..	1	278	10	.....	..	..	..
August	5	418	16	.....	..	..	..	1	1320	53	670	281	..	..	2	278	10	15	0	16	0
September.....	3	306	12	109	118	10	2	1	1295	51	600	271	0	..	..	.....	..	.....	..	..	..
October	1	23	1	165	14	10	12	1	1320	53	475	187	10	..	1	200	8	.....	..	..	..
November	1	78	3	218	37	6	2	1	1300	52	650	205	..	..	1	35	2	18	2	10	..
December	1	16	1	187	25	4	0	1	1200	48	600	194	10	..	..	.....	..	.....	..	..	..
	2	2,816	..	2094	477	11	6	1	18120	..	7602	3885	19	19	1	1570	....	83	46	17	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	GAY'S RIVER.						MONTAGU.						OLDHAM.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	3	200	8	..	..	..	..	3	200	8	..	..	..	..	1	100	4	194	106	7	0
February	2	184	7	..	..	..	..	2	184	7	..	..	..	..	1	115	4	93	43	10	0
March	2	113	4	25	27	5	0	2	113	4	25	27	5	0	1	130	5	113	65	18	0
April	1	162	9	..	..	..	..	1	162	9	..	..	..	..	2	207	8	10	34	11	17
May	1	185	7	22	34	10	10	1	185	7	22	34	10	10	2	401	12	188	143	11	4
June	1	180	7	8	5	2	14	1	180	7	8	5	2	14	3	536	21	92	81	0	0
July	1	70	3	18	4	18	14	1	70	3	18	4	18	14	2	220	19	72	40	19	15
August	1	157	9	3	2	7	15	1	157	9	3	2	7	15	2	190	7	40	26	3	18
September	1	124	5	..	..	..	..	2	124	5	..	..	..	..	2	250	10	68	80	2	15
October	2	162	6	..	..	..	..	2	162	6	..	..	..	..	2	310	12	152	131	2	19
November	2	86	3	..	..	..	..	2	86	3	..	..	..	..	2	373	15	102	112	12	0
December	1	50	2	..	..	..	..	1	50	2	..	..	..	..	1	81	3	129	133	18	16
	2	1673		76	74	4	5	2							2	2913	...	1253	999	17	8

MONTHLY STATEMENT FOR EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	RENFREW.						SHERBROOKE.						STORMONT.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwts.	Grs.
January	1	16	..	..	..	..	..	9	3240	130	948	448	15	0	1	675	27	24	95	0	0
February .....	..	..	..	..	..	..	..	9	3105	124	936	538	0	7	1	630	25	84	338	10	0
March .....	..	..	..	..	..	..	..	9	2970	118	878	387	13	0	1	720	29	12	2	8	0
April	1	123	5	3	0	17	10	10	2916	116	713	235	17	0	1	612	24	65	191	0	0
May	1	413	12	..	..	..	..	8	2835	113	948	310	2	0	1	590	23	57	223	4	0
June	1	386	15	..	..	..	..	8	2652	106	859	212	9	0	1	520	20	44	163	0	0
July	1	543	21	..	..	..	..	10	3016	120	727	232	12	10	1	575	23	39	111	10	0
August	1	492	19	..	..	..	..	10	2106	84	323	128	18	0	1	487	19	43	163	8	0
September	1	296	11	..	..	..	..	10	2028	81	485	207	10	0	2	702	28	35	111	0	0
October	1	330	12	..	..	..	..	10	1820	72	664	265	5	0	1	615	24	45	138	11	0
November	1	248	10	..	..	..	..	8	1976	79	357	157	11	0	1	700	28	50	189	19	0
December	1	364	14	..	..	..	..	10	2834	113	631	232	6	0	1	694	27	53	189	13	0
	1	3211	..	3	0	17	10	9	31498	....	8470	3356	18	17	1	7520	..	551	1917	3	0

MONTHLY STATEMENT FOR EACH GOLD DISTRICT—(CONTINUED.)

MONTH.	TANGIER.						UNIAKKE.						WAVERLEY.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	897	36	275	95	18	0	3	552	22	126	28	15	15	1	90	3	10	8	11	0
February	3	1,164	46	.....	..	..	..	4	767	31	291	155	14	15	1	72	3	18	3	10	0
March	2	1,736	69	162	100	2	0	5	873	35	444	161	2	19	1	88	3	7	3	4	0
April	2	793	31	51	28	15	6	4	523	21	237	172	8	13	1	62	2	19	2	14	0
May	2	1,278	51	74	47	19	0	4	544	21	202	107	8	13	1	40	1	14	3	13	0
June	2	759	30	12	5	8	0	3	295	11	241	74	8	1	1	54	2	4	6	10	0
July	2	289	12	142	127	8	0	3	899	36	68	61	11	0	2	84	3	12	7	15	0
August	2	339	13	4	1	15	0	3	723	29	264	61	19	0	2	110	4	4	5	17	0
September	2	531	21	131	119	11	12	4	652	26	213	78	13	6	...	.....	....	3	3	14	0
October	2	646	26	154	135	5	0	4	524	51	237	92	19	0	1	23	1	5	..	15	0
November	2	1,164	46	.....	..	..	..	3	478	19	159	78	17	19	1	78	3	.....	..	..	..
December	2	1,386	55	135	136	..	0	4	575	23	327	122	16	19	1	272	10	.....	..	..	..
	2	10,982	....	1,140	798	1	18	3	7,405	....	2,809	1,197	15	0	1	973	....	96	46	3	0

MONTHLY STATEMENT FOR EACH GOLD DISTRICT—(CONTINUED).

MONTH.	UNPROCLAIMED.							WINE HARBOUR.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	4	556	22	...	..	..	..			
February	4	358	15	...	..	..	..			
March	5	252	2	129	35	12	12							
April .....	...	...	...	...	..	..	..
May .....	...	...	...	...	..	..	..
June .....	...	...	...	...	..	..	..
July	1	100	4	4	3	2	0							
August	1	100	4	51	2	5	13							
September	1	52	1	...	..	..	..			
October	2	215	8	1	..	3	18							
November	1	162	6	42	88	0	16							
December	2	503	20	7	21	0	10							
	1	2,198	...	302	150	4	21							

G O L D.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold Extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.	Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz. Dwt. Gr.		A day.	A year.
1862	7,275			6,473	1 2 11	156,000	\$ 83	\$249
1863	14,001	14	17	17,002	16 11	273,264	92	276
1864	20,022	18	13	21,434	18 16	252,720	1 42	426
1865	25,454	4	8	24,423	1 0 20	212,966	2 15	645
1866	25,204	13	2	32,161	15 2	211,796	2 14	642
1867	27,314	11	11	31,386	17 9	218,894	2 24	672
1868	20,541	6	10	32,262	12 17	241,462	1 53	459
1869	17,868	0	19	35,147	10 4	210,938	1 52	456
1870	19,866	5	5	30,829	12 21	173,680	2 05	615
1871	19,227	7	4	30,791	12 11	162,992	2 12	636
1872	13,094	17	6	17,093	15 7	112,476	2 09	627
1873	11,852	7	19	17,708	13 9	93,570	2 28	684
1874	9,140	13	9	13,844	13 5	77,246	2 12	636
1875	11,208	14	19	14,810	15 4	91,698	2 20	660
1876	12,038	13	18	15,490	15 13	111,304	1 94	582
1877	16,882	6	1	17,369	19 10	123,565	2 46	738
1878	12,577	1	22	17,990	13 23	110,422	2 05	615
1879	13,801	8	10	15,936	17 8	92,002	2 34	702
1880	13,234	0	4	14,037	18 20	103,826	2 18	54
1881	10,756	13	2	15,556	12 20	126,308	1 52	456
1882	14,107	3	20	22,081	12 18	106,884	2 37	711
1883	15,446	9	23	25,954	10 21	97,733	2 84	926
Total	350,916	13	2	470,776	.....	3,362,106	.....	.....

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

GYPSUM EXPORTS—Ton of 2,000 lbs.

Windsor	Tons.	102,715	Value.....	\$102,184
Cheverie	"	31,558	"	21,461
Walton	"	6,695	"	5,023
Hantsport	"	3,700	"	3,386
		144,668		\$132,052

BUILDING STONES.

Pictou	Tons.	105	Value.....\$	800
Antigonish	"	76	"	532
*Wallace .....	"	..	" .....	...
	

GRINDSTONES, ETC.

Parrsborough	Tons.	155	Value.....\$	1,085
*Lower Cove .....	"	...	" .....	.....
	

MANGANESE.†

Tenny Cape	Tons.	125	} Value.....\$	
Walton	"	5		
Cheverie	"	4		12,462
Loch Lomond	"	16		.....
		150		\$ 12,462

Average number persons employed mining 20

LIMESTONE, ETC.

St. Peters	Tons.	3,672	Value.....\$	3,672
Pugwash	"	133	"	133
Londonderry, ankerite....	"	7,672	"	
Brookfield	"	15,000	"	
		Tons, 26,477		\$ 3,805

*No returns.

† These mines do not work continuously.

IRON MINING.

Londonderry52,410 tons.

AVERAGE FORCE EMPLOYED DAILY.

Belowground Miners	81	Number of days labor ..	21,898
“ Laborers	29	“ “ ..	7,179
Aboveground Mechanics, etc.	17	“ “ ..	4,774
“ Laborers.....	97	“ “ ..	24,285
Total.....	224	“	58,136

COPPER MINING.

Coxheath60 tons (concentrated)

AVERAGE FORCE EMPLOYED DAILY FOR SIX MONTHS.

Belowground	45	} Number of days labor...	12,058
Aboveground.....	46		

I give here the following extracts referring to Nova Scotia from the Dominion census of 1881, which will show the extent of certain operations, returns of which do not appear fully in my reports.

Limestone, number of Kilns,	108	Value of production..	\$49,738
Gypsum “ Mills,	4	“ “ ..	1,200
Brickworks “ Works,	41	“ “ ..	64,775
Grindstones “ “	3	“ “ ..	50,737
Manganese “ Tons	316	.....
Phosphate of Lime “	165	.....
Building Stone } for dressing. }	Cub. ft. 214,819	.....

INTERCOLONIAL RAILWAY.

STATEMENT shewing the number of tons of Coal received at the following stations from Mines in Nova Scotia for year ending 31st December, 1883:

STATIONS.	No. TONS.	STATIONS.	No. TONS.
Halifax	50,566	<i>Brought forward</i> ..	.....
Bedford	434	Shediac	243
Windsor Junction	5,382	Point du Chene	73
Wellington	92	Moncton	13,144
Enfield	480	Salisbury	1,356
Elmsdale	124	Petitcodiac	146
Milford	54	Penobsquis	1,668
Shubenacadie	390	Sussex	491
Stewiacke	262	Apohaqui	28
Brookfield	105	Norton	28
Truro	6,938	Passekeag	18
Valley	36	Hampton	717
Riversdale	10	Rothsay	212
West River	34	Cold Brook	1,200
Glengarry	6	Saint John	21,897
Hopewell	1,182	Berry's Mills	22
Stellarton	24	Weldford	42
New Glasgow	15,357	Chatham Junction	93
P. Landing	87,708	Chatham	477
Belmont	10	Kent Junction	299
DeBert	33	Newcastle	408
Londonderry	66,464	Bathurst	72
East Mines	28	Jacquet River	8
Wentworth	81	New Mills	24
Greenville	30	Charlo	12
Thompson	70	Dalhousie	12
Oxford	477	Campbellton	126
River Philip	29	Little Metis	12
Athol	18	St. Flavie	18
Maccan	51	St. Luce	4
Nappan	85	Rimouski	343
Amherst	3,440	Trois Pistoles	16
Aulac	228	River du Loup	61
Sackville	1,606	St. Paschal	12
Dorchester	20,749	St. Anne	4
Memramcook	338	S. Henri	101
Painsec	13	Chaudiere	54,790
<i>Carried forward</i> ..		<i>Total</i>	361,111

INTERCOLONIAL RAILWAY.

STATEMENT, shewing the quantities, in tons, of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway, during the year 1883.

MONTHS.	ACADIA.	ALBION.			DRUMMOND.	VALE.	SPRING HILL.		CHIGNECTO.
		Round	Small.	Coke.			Round.	Small.	
January		1801	38	.....	17	2365	9334	120	.....
February	21	1898	25	.....	13	1415	9467	.....	.....
March	10	2211	16	11	52	6	10069	.....	.....
April		2812	21	.....		27	10987	.....	.....
May		2651	.....	.....	15	.....	9609	.....	.....
June		983	.....	.....			7527	.....	1288
July		1477	113	.....			2914	.....	.....
August		930	25	.....		10	8506	.....	2330
September	14	1547	34	21	.....		5312	12	1984
October		3275	58	.....	34	30	6256	.....	735
November		2474	74	13	.....		7426	.....	1685
December		1323	68	.....			7456	.....	1991
	45	23382	472	45	131	3853	94913	132	10015

MONCTON, N. B., 3rd March, 1884.

From the following Stations:

STATIONS.	NO. TONS.
Drummond	57,397
Hopewell	15,988
Stellarton	143,283
New Glasgow	60,653
Maccan	7,733
Spring Hill	76,037
Albion	20
Total	361,111

MONCTON, N. B., 3rd March, 1884.

FINANCIAL STATEMENT.—GOLD, &c.
Mines Department, for Twelve Months ended December 31st, 1883.

MINES REPORT.

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DISTRICT.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Totals.	Return Rents.	Return Royalty.	Royalty Commiss'n.	Salaries and Surveys.	Totals.
Caribou.....	.....	213 13	\$ 213 13	\$.....	\$.....	\$ 8 26	\$ 11 00	\$ 19 26
Darr's Hill.....	\$ 280 00	571 50	851 50	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	144 00	50	144 50	.....	.....	.....	.....	.....
Gay's River.....	.....	1 86	1 86	.....	.....	.....	.....	.....
Lawrencetown.....	.....	36	36	.....	.....	.....	.....	.....
Montagu.....	4 00	21 34	25 34	.....	.....	.....	.....	.....
Oldham.....	6 00	311 70	317 70	.....	.....	11 01	48 00	59 01
Ovens.....	52 00	.....	52 00	.....	.....	.....	.....	.....
Renfrew.....	10 00	23 35	33 35	.....	.....	1 15	42 00	43 15
Sherbrooke.....	86 00	1258 21	1344 21	12 00	.....	63 71	402 80	478 51
Stormont.....	134 00	585 89	719 89	.....	.....	36 24	38 00	74 24
Tangier.....	113 00	209 76	322 76	30 00	.....	35	.....	30 35
Uniacke.....	70 00	223 27	293 27	.....	.....	15 96	130 00	145 96
Waverley.....	204 00	18 23	282 23	180 00	2 79	42	.....	183 21
Wine Harbor.....	72 00	.....	72 00	.....	.....	.....	7 50	7 50
Unproclaimed.....	1128 00	3050 85	4178 85	.....	.....	.....	466 30	466 30
Prospecting Licenses.....	.....	.....	3782 22	.....	.....	.....	.....	* 178 00
	\$ 2363 00	\$6489 95	\$12635 17	\$222 00	2 79	\$ 137 10	\$1145 60	\$ 1685 49

* Return.

OTHER THAN GOLD.

Mines Department, for Twelve Months ended Dec. 31st, 1883.

COUNTIES.	RECEIPTS.				EXPENDITURE.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Return Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	\$ 20 00	\$ 150 00	\$	\$ 170 00	\$	\$	\$
Antigonish	160 00	50 00	.....	210 00	.....	.....	.....
Cape Breton.	540 00	325 00	53587 08	54452 08	60 00	380 76	440 76
Colchester.	460 00	300 00	.....	760 00	.....	.....	.....
Cumberland	500 00	200 00	12174 78	12874 78	20 00	585 00	605 00
Digby	20 00	.....	.....	20 00	.....	.....	.....
Guysborough	80 00	.....	.....	80 00	.....	.....	.....
Hants	100 00	.....	.....	100 00	.....	.....	.....
Inverness	180 00	50 00	.....	230 00	20 000	.....	20 00
Kings	80 00	.....	.....	80 00	.....	.....	.....
Lunenburg	160 00	.....	.....	160 00	.....	.....	.....
Pictou	620 00	.....	39191 61	39811 61	.....	.....	.....
Richmond	120 00	25 00	.....	145 00	20 00	.....	20 00
Victoria	60 00	50 00	.....	110 00	.....	.....	.....
Yarmouth	80 00	.....	.....	80 00	.....	.....	.....
Examinations .....	.....	.....	.....	52 00	.....	.....	409 72
	\$ 3180 00	\$ 1150 00	\$104953 47	\$ 109335 47	\$ 120 00	\$ 965 76	\$ 1495 48

ABSTRACT ACCOUNT.

Receipts and Expenditure for the Twelve Months ended 31st December, 1883.

RECEIPTS.		EXPENDITURE.	
Licenses to Search.....	\$ 3180 00	Return Licenses to Search.....	\$ 120 00
“ “ Work.....	1150 00	Salaries and Surveys	965 76
Royalty.....	104953 47	Examinations	409 72
Examinations	52 00		<u>\$ 1495 48</u>
Rents.....	\$ 2363 00	Return Rents.....	\$ 222 00
Royalty.....	6489 95	“ “ Royalty.....	2 79
Prospecting Licenses.....	3782 22	Royalty Commission.....	137 10
	<u>\$ 12635 17</u>	Salaries and Surveys	1145 60
		Return Prospecting Licenses.....	178 00
			<u>\$ 1685 49</u>
		General Expenses.....	\$ 5865 72
		Postage	82 98
		Stationery and Printing.....	125 12
			<u>\$ 6073 82</u>
			<u>\$9254 79</u>

REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1884.



HALIFAX, N. S.
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.
1885.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1884.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled by him from official and other returns made to the Department of Mines during the year 1884.

I remain

Your Honor's obedt. servant,

CHARLES E. CHURCH,

Commissioner of Public Works and Mines.

HALIFAX, February 16, 1885.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(Member of the North of England Institute of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,

HALIFAX, February 16, 1885.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia during the year 1884.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1884, compared with that of the previous year:

	1883.	1884.
Gold.....Ounces....	15,446	16,079
Iron Ore.....Tons.....	52,410	54,885
Manganese Ore....."	150	302
Copper....."	60	110
Lead....."		100
Antimony....."		600
Coal raised....."	1,422,553	1,389,295
*Gypsum....."	144,668	111,068
*Building Stone....."	181	780
Coke made....."	44,189	40,085
Limestone....."	26,477	25,567
*Grindstones, etc....."	155	2,200

* Amounts exported, Home Consumption unknown.

Through the kindness of the Collectors of Customs at the various ports of the Province I am enabled to give further details under this head at the end of the report.

In addition to a detailed notice of the operations at each mine, and the usual statistical tables, I submit a summary of the minerals exported, not paying royalty to your honorable Government.

I also beg leave to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton.

These gentlemen have been occupied in paying regular visits to the mines in their respective districts, and in making enquiries into accidents, complaints, etc. With regard to ventilation, one of the most important points in connection the working of coal mines, I would here remark that in Nova Scotia proper it is produced in most of the mines by fans, and generally is sufficient in quantity and properly circulated. In Cape Breton, fans are in operation only at two collieries, the rest are ventilated by furnaces, which are not adapted for the shallow mines of the Island. When the Cape Breton collieries were first opened their furnaces provided sufficient air, but now that the workings are greatly extended the results are not equally satisfactory.

At the Spring Hill and Victoria collieries mechanical ventilators of an inexpensive and efficient character have given good results; and the introduction of fans of the same type, or of the Guibal pattern, as at the Sydney mines, would be found beneficial in the other Cape Breton collieries. In several cases during the past season Mr. Neville found that this highly important matter had been seriously neglected. It was immediately put right on his drawing attention to it; but it is not the intention of the law that a coal mine should be operated with imperfect ventilation until an official inspection is made. The responsibility of maintaining a proper and sufficient amount of air rests on the management. I have instructed Mr. Neville in future to report any such violation of the ventilation clauses of the Act, with a view to having the law at once enforced.

After the close of the meeting of the British Association for the advancement of Science, at Montreal, a party of the members visited this Province on the invitation of your honorable Government. They saw various points of interest, including the Cumberland Coal Field, the Londonderry Iron Mines, the Gypsum deposits, and the Gold Mines at Montagu. It is to be regretted that the time at their disposal did not permit of their trip being extended to Pictou and Cape Breton, but they were very much pleased with what they saw, and the favorable impressions they carried away with them will not fail to prove of benefit to the Province.

COAL TRADE.

The total sales for the year 1884 amounted to 1,261,650 tons, made up of 945,518 tons of round and 316,132 tons of slack coal, as compared with 1,297,523 tons during the year 1883, comprising 1,016,418 tons of round and 281,105 tons of slack coal. This would show a decrease of 70,900 tons in the round coal sales, and an increase of 35,027 tons in the slack coal sales; making a total decrease of 35,873 tons.

The increase in the sale of slack coal (which does not pay royalty) is worthy of notice, and the following table will show that its value for economic purposes is being appreciated :

Total sales of slack coal, year 1884.....	316,132 tons.
" 1883.....	281,105 "
" 1882.....	247,100 "
" 1881.....	209,011 "
" 1880.....	177,977 "
" 1879.....	113,719 "
" 1878.....	131,528 "
" 1877.....	109,155 "

At present about 85,000 tons of the slack are burned into coke. The following are the principal customers using slack for other purposes during the past year :

United States	51,519 tons.
Quebec.....	46,353 "
New Brunswick	38,061 "
P. E. Island.....	27,532 "
Nova Scotia	75,000 "

This grade of coal now forms the bulk of our exports of fuel to the United States; and I believe it is used there chiefly for mixing with anthracite smalls for boiler furnaces. Most of that sold in the Dominion is for steam raising in stationary boilers, and some, especially in Prince Edward Island, for lime burning. It is in many cases an excellent fuel for raising steam, and its introduction at the boilers of our collieries has given results equal to that of round coal, at a diminished cost.

The following are the most noticeable points in the coal trade :

The home sales were 493,050 tons compared with 471,327 tons in 1883, and 458,592 tons in 1882.

The Province of Quebec took 396,782 tons against 410,605 tons during the preceding year.

The sales to New Brunswick were 158,420 tons, a decrease of 9,320 tons.

Newfoundland took 86,216 tons as compared with 61,678 tons during the preceding year.

The sales to Prince Edward Island show an increase of 2,311 tons, being 50,399 tons.

The West India sales have decreased from 31,860 tons in 1883 to 9,595 tons during the past year.

The sales to the United States were 64,515 tons (of which only 12,996 tons were round coal), the smallest recorded since the year 1850, except during 1879, when they were 51,641 tons.

CUMBERLAND COUNTY.

The total sales of this county amounted to 258,405 tons against 222,347 tons in 1883. This increase is due to the greatly augmented output of the Spring Hill Mines; the Chignecto colliery having fallen off in its production.

The home sales were 59,502 tons against 43,731 tons during the preceding year.

The sales to New Brunswick were 93,724 tons against 127,751 tons in 1883.

The province of Quebec took 104,243 as compared with 43,483 tons in 1883, and 58,561 tons in 1882.

COLLIERIES.

Boston Coal Mining Company.—In the beginning of the year a few tons of coal were taken from this colliery for local sales.

Chignecto.—During the past year, the second set of balances were worked, and the east levels extended. On the west side work was discontinued after the second balance was finished. A dip slant was started near the bottom on a south-west course, and driven down several hundred feet and bords broken off. The mine was idle during great part of the season, and in the fall a few men were put in to take out coal for country sale. The out put was 11,644 tons against 23,395 tons raised during the previous year.

Joggins.—The operations at this mine have been confined to the new slope, which is fully opened out. A small furnace has been put up. The rotary screen at this colliery has continued to work well, and the nut coal is said to find favor in the market. Shortly before the close of the year the colliery office was burnt down, and the pit plan destroyed. The benefit of the sections of the Act which require

duplicates of colliery plans was well shown, for the department have been enabled to furnish them with a plan for temporary use. The out put was 25,034 tons against 26,098 tons during the preceding year.

Milner.—During the past season Mr. John Hurley has taken out a few tons of coal for local sales.

Minudie.—Work has been steadily carried on at this Mine during the past season. The coal is of good quality and mined by the long wall system in fair sizes. In the fall work was interrupted for a short time through the roof closing the air way, but the stoppage was not of any moment. The output was 10,023 tons against 4,451 tons in 1883.

Maccan.—Mr. William Patrick opened the seams formerly worked on the Lawson area, on a property adjoining to the west. A pit was sunk on a seam about two feet thick, of good quality; and a slope driven down 75 feet on another overlying seam of about the same thickness. These beds are separated by about 130 feet of strata, and dip S. 45° E. at an angle of about 30°. Heapsteads and houses have been built, and a syphon put in to drain the slope. The coal resembles that opened at the Lawrence Colliery on the River Hebert, and is of good quality, and in demand for local sales. The returns show that 94 tons were raised.

Spring Hill.—The operations at this extensive colliery have been pushed with vigor, and the output again shows an increase, being 232,481 tons against 193,151 tons in 1883. The sinking on the new seam has been continued. A fan has been put up at the west slope, and works on the "blow down" principle. Arrangements have been made to concentrate the pumping plant at the west slope, where a pair of Allison pumps, having 30 inch steam and 14 inch water cylinders, will raise the water from the east, west and north mines through 12 inch wrought iron columns.

The coking qualities of the coal in the newer openings at these mines have been found satisfactory, and a considerable tonnage has been coked at Londonderry for the blast furnaces.

Salt Springs.—Mr. Pitblado and others opened a seam of coal near the Salt Springs Station, five miles east of Spring Hill Junction. The seam is about three feet thick, and is apparently of fair quality, as shown by the following analysis:—

	Slow Coking.	Fast Coking.
Moisture	1.47	1.47
Volatile combustible matter	33.46	34.70
Fixed carbon	55.87	54.63
Ash	9.20	9.20
	<hr/>	<hr/>
	100.00	100.00
Sulphur . . . . .	.79	.79

It is not possible to say at present if this seam and those found in its immediate vicinity can be identified with any of those worked at Spring Hill; but operations here may throw some light on the structure of the eastern end of the Cumberland coal field.

Scotia.—Operations were continued at this mine on the usual scale. In the spring Mr. George Wilson sunk a new slope, 95 feet deep, to the westward of the old mine, referred to in my last report, leaving a barrier. Later on this barrier was broken through, and as the fire appeared to have died out some pillars were taken from the old mine. The returns show a production of 609 tons.

PICTOU COUNTY.

The total sales were 464,181 tons compared with 461,809 tons in 1883.

The home sales were 262,780 tons against 260,980 tons during the preceding year.

The sales to Quebec were 139,934 tons against 145,527 tons in 1883.

New Brunswick took 25,233 tons against 7,402 tons in 1883.

Prince Edward Island took 31,343 tons compared with 38,622 tons during 1883, and 41,463 tons during 1882.

COLLIERIES.

Acadia.—The regular operations at this colliery present no new features of interest. The new lift is being successfully worked, the slope haulage being now about 2,350 feet. Preparations are being made to replace the present pump by one larger and better adapted to meet the extension of the workings. The output of the colliery was 115,451 tons against 115,028 tons in 1883.

Albion Mines.—The output from these collieries was 201,557 tons compared with 168,231 tons during the preceding year. The fan formerly at the Foord pit was removed to the McGregor workings, and should provide ample ventilation for some time to come. Two boilers have been put up to drive it. The workings in the third seam have been regularly carried on. There were 25,681 tons of coke made during the year.

Intercolonial.—During the past year a compound 180 horse power engine was placed in the 1,700 feet level to assist the main haulage engine. Two Lancashire boilers were put up to increase the steam power, and the boilers housed in with an iron roof. In March the lamp house was burned, and all the safety lamps destroyed. A new fire proof house has been erected in its place. The main slopes were extended and the new lift is fairly under way.

The No. 4 slope and the pit in the second seam were not utilized during the summer. The out put was 120,656 tons as compared with 147,111 tons in 1883.

Vale.—During the past season the extraction of the pillars in the 1800 foot level of the McBean seam has been carried on successfully. The slope is being extended 700 feet for a new lift. The coal continues to be of good quality and to preserve its thickness. The slope has been re-timbered, and the track lowered.

In the Greener seam the slope has been extended to a distance of about 1000 feet, and levels turned away. The coal has thickened to seven feet, and is stated to be of very good quality, and will prove an important addition to the coal resources of the county. The branch from the company's railway to the mouth of the slope is ready for rail laying, and it is expected that the mine will be in full operation in the spring. The out put was 73,529 tons, against 74,656 tons in 1883.

During the spring Mr. John McNeil did a little work on the Kirby and Merigomish areas.

Mr. A. McG. Barton prospected his coal property lying to the south and west of the Vale area, and traced some of the Vale seams over a large portion of it. His work is considered to have shown the presence of a seam, hitherto unknown, lying above the six feet or Greener seam now being opened on the Vale area.

CAPE BRETON COUNTY.

The total sales during the past year from Cape Breton County were 539,064 tons compared with 612,614 tons in 1883.

The home sales showed a slight increase, being 179,768 tons against 166,262 tons during the preceding year.

New Brunswick took 39,463 tons, an increase of about 7,000 tons over the sales of the preceding year.

The Newfoundland sales were 83,143 tons against 58,342 tons sent there during 1883.

Prince Edward Island took 19,056 tons, nearly double the amount sold there during the preceding year.

The sales to Quebec were 152,605 tons against 218,595 tons in 1883, and 198,892 tons in 1882.

The sales to the West Indies show a falling off of 21,872 tons, being only 8,909 tons.

The sales to the United States were 62,565 tons against 93,433 tons during the previous year.

The sales to other points were inconsiderable.

COLLIERIES.

Sydney.—The workings at this colliery have been regularly extended in pursuance of the plans laid down at their start. The system of electrical signaling between the engine house and the pit bottom has been found to work satisfactorily. Near the top of the north slant an automatic switch has been found useful, and could in some cases be advantageously copied. The full boxes coming up close it, and it re-opens, so that if the rake breaks away at the bank head it will pass into a short blind slant. When the empty rake is going down, the switch is kept closed by the bank head man until it has passed. The returns show that 149,378 tons of coal were raised, against 162,866 tons during the preceding year. There were 81 tons of coke made.

Victoria.—The work of opening out this mine has been satisfactorily carried on. The railway has been re-ballasted and laid with 50 lb. steel rails, and substantial stone culverts have been put in. The new pier is arranged to have gravity tracks for both full and empty cars. There is a depth of 30 feet of water at the end of the pier, and it is arranged that three steamers can be bunkered at the same time. There have been 14,112 tons of coal raised.

Barasois.—A slope has been started about $2\frac{1}{2}$ miles from the Low Point Mine, on a seam considered to be the extension of the Langan coal. The seam dips N. 30° E. at an angle of 16° , and presents 6 feet of clean bright coal. It is proposed in the spring to open out and complete the winning, and to extend the railway from the Low Point Colliery to enable this mine to ship at the South Bar.

Lingan.—At this mine work has been confined principally to the low lift in the sea area. Here the coal presents the following section:—

	Ft.	In.
Top coal roof	1	3
Coal	1	8
Band	0	5
Coal	5	6
Coal		8
	9	6

The levels have been driven in about 20 chains and rooms broken off. The workings in the sea area are very dry, and a portable plunger pump readily removes all the water. All the available pillars in the No. 4 level were taken out. The out-put was 23,404 tons compared with 16,482 tons during the year 1883.

Reserve.—During the past season this colliery raised 96,114 tons, against 110,456 tons in 1883. The workings have been extended from both slopes. At the request of adjoining proprietors a survey was made of the main slope and bottom level by Mr. H. R. McKenzie,

C. E., and the accuracy of the pit plans confirmed. At a point 14 chains down the slope a dip slope has been started to cut the Emery seam, and it is expected that it will soon reach it. Wooden water pipes have been successfully used for pump columns in this mine, and their cheapness should recommend their adoption for short lifts.

International.—The working faces at this mine have been extended on their usual course. The coal is now weighed at the bank head as it is raised. The introduction of an underground locomotive on the new engine road, and the adoption of some form of mechanical ventilation, are being considered. The out-put was 87,216 tons as compared with 99,018 tons during the year 1883.

Little Glace Bay.—A few tons of coal were taken from the Hub seam during the past season. Operations in the Sterling pit have been continued as usual in the rise coal. The proposed concentration of the shipping of this colliery and of the Caledonia Mines at the Glace Bay Harbor has been carried out, and I believe works well. The out-put was 36,138 tons against 75,848 tons during the preceding year.

Bridgeport.—During the summer Mr. Henry Mitchell re-opened the workings of the General Mining Association on their area on the south side of Lingan Basin. The following history of this mine, taken from Mr. Brown's work on the Coal Fields of Cape Breton, will be of interest.

The mine was first opened in 1830 by a level driven from the shore along the outcrop of the seam now known as the Phalen. Pits were sunk at intervals of about a quarter of a mile, and the coal was raised by horse gins. At the face of the cliff the seam presented the following section:—

	Ft.	In.
Coal	3	0
Shale	0	5
Coal	5	3
	<hr/>	
	8	8

As the workings were advanced from the shore the shale increased to a thickness of twenty-eight feet at a distance of half a mile. Beyond this point it thinned rapidly, and at the Last pit, now being worked, the coal bed shows as follows:—

	Ft.	In.
Coal	3	0
Stone	9	0
Coal	6	0

A bore hole put down about 300 yards to the dip of the level showed the shale to be only fourteen inches thick. (In the Reserve Mine, working the same seam, a short distance to the south, the stone parting is of insignificant thickness.)

At first the coal was lightered out to vessels anchored in the open bay, but in 1833 a railway was built along the sand bar to Lingan Harbor. The Bridgeport is a good domestic fuel, and valuable as a gas coal, yielding nearly 10,000 cubic feet of gas per ton.

Mr. Mitchell has connected his pit with the International Company's railway, put up houses, etc., and shipped 3,115 tons of coal. The coal looks well, and is apparently similar to the Reserve coal, the qualities of which are well known. Mr. Brown estimates that the property contains 12,600,000 tons of coal in the Phalen seam, of which amount the General Mining Association extracted about 175,000 tons.

Caledonia.—During the past season the railway to the Glace Bay Harbor was completed, and three shoots built. The old railway to Port Caledonia has been dismantled. The extraction of pillars has been successfully continued in the rise coal. The out-put was 69,461 tons against 51,500 tons in 1883.

Ontario.—In the summer enough water was taken out to permit work being carried on in the second lift by Messrs. J. and J. J. McDonald. The out-put was 5,890 tons.

Block House.—During the summer a good deal of coal was taken from the deeps, the out-put being 23,668 tons. Operations were confined to the pillars, and present no new features of interest.

Gourrie.—Work has been carried on vigorously at this mine during the past season. The main levels have been continued, and rooms broken off. The out-put was 89,384 tons against 73,290 tons in 1883.

At the instance of parties owning an adjoining area a survey was made by Mr. McKenzie to see if any trespass had been made. The result of the survey confirmed the accuracy of the pit plans.

MISCELLANEOUS.

Some more prospecting work was done on the "Anthracite" coal at McAdam's Lake, near Sydney.

At Beech Hill, near the Renfrew Gold Mines, some work was done on a small seam of coal of an anthracitic character.

Discoveries of coal were reported at Upper Economy, and at Oxford Station on the Intercolonial Railway.

No work was done at the McBert Mine beyond a little prospecting. The coal opened in 1883 by a slope, as referred to in my last report, would appear from the following analysis, made by me, to be of fair quality:—

	Fast Coking.
Hygroscopic moisture	1.594
Volatile combustible matter	33.188
Fixed carbon.....	58.206
Ash.....	7.012
	<hr/>
	100.00
Sulphur	2.648

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER AND CUMBERLAND.

WESTVILLE, PICTOU Co.

Dec. 31st, 1884.

E. GILPIN, ESQ.,

Inspector of Mines :

DEAR SIR,—I beg leave herewith to submit the following report of my work for the past year as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland.

VALE COLLIERY.

I made eleven official inspections of this mine, namely: on January 30, February 22, March 24, April 24, May 9, June 11, August 1, September 16, October 24, November 19, December 27. On all my inspections I found the air good, and every care manifested in the working of the mine. Considerable care and expense have to be bestowed by this company on the roof of the slope to keep it in good order. On some of my visits I found that gas had been given off in the goaf. The management promptly complied with the law in putting on a shot firer.

During the past year they have sunk the McBean slope a further distance of 400 feet. The roof still continues bad, but the coal maintains its height and quality, and thus far no faults have been met in the coal bed.

Greener Seam.—The slope on this seam, with the necessary travelling ways and pipe slope, has been extended a distance of eleven hundred feet, and levels driven east and west a distance of about three chains, and a Cameron pump placed in the bottom of the slope, which discharges the water up to the surface. A small furnace is being built, which will be used temporarily, I am informed, until a fan be erected. I am pleased to be able to say that during the operation of opening up this seam there has not been an accident of any nature whatever; not even a box ran away during all the sinking.

HALIFAX COAL COMPANY.

Slopes No. 1 & 2.—I officially inspected those slopes 12 times during the year, namely: Jan. 24, Feb. 18, March 13, April 15, May 30, June 19, July 31, Aug. 14, Sept. 13, Oct. 17, Nov. 10, Dec. 17, and carefully travelled through the mine, visiting the working faces, airways, inlets,

and outlets. Found the air on every occasion satisfactory. During the year this company have opened a new lift to the dip, and have extended their levels and drove up plane ways.

McGregor Pit.—I visited this pit 14 times during the year, namely: Jan. 12 and 17, Feb. 18, March 20, April 16, May 5, June 17, July 30, Aug. 13, Sept. 15, Oct. 16, Nov. 11 and 14, Dec. 16; and would say that this seam of coal requires great care in operating it as the coal is of a gaseous nature and evolves considerable quantities of gas, but thus far during the past year no one has been burned or any accident occurred through gas.

The air has been sufficient during the past year, but the management have now erected a fan of the largest dimensions of any in the Province, the working of which I have no doubt will greatly increase the ventilation. I found the law in all respects fully complied with on behalf of the management, who on their part exercise every care to compel their workmen to do likewise. On several occasions safety lamps have been damaged either by accident or carelessness, and too much attention cannot be paid to any infringement of this kind in a mine where safety lamps are used.

ACADIA COLLIERY.

I have inspected this mine 13 times during the year, namely: on Jan. 28, Feb. 21, March 10, March 26, April 22, May 29, June 25, July 28, August 26, Sept. 23, October 28, Nov. 25 and December 15, and on each occasion I thoroughly inspected travelling-ways, air-courses, and working faces, and found that the management had an adequate quantity of air traversing through the mine. I also inspected so far as practicable the waste workings.

In my last report I made reference to a new lift as having been driven. So far as possible the coal has been extracted from the pillars in the old lift, and the underground plant has now been transferred to the new lift, and full operations commenced upon it.

INTERCOLONIAL COAL COMPANY.

I have officially inspected this mine 17 times during the year, namely: Jan. 19, February 15 and 19, March 17, April 18, May 6, June 13 and 25, July 29, August 30, Sept. 22, Oct. 20, Nov. 12, 24, 25 and 29, Dec. 29, and as in the preceding mines examined air ways and working faces of the mine and tested the volume of air per minute. On each occasion I found matters in this respect very satisfactory. This company has not resumed work this year in the second seam beyond keeping the water out and the air in circulation. The No. 4 slope is in the same situation. In the old slopes, Nos. 1 and 2 in general, they have been extracting the pillars, and have successfully taken them out from No. 1 side, and have now transferred the underground plant to their new lower lift, which has been developed to enable them to begin full operations upon it. In my report of last

year I referred to the area of up-cast shaft having been enlarged. The management have in consequence had less difficulty with gas than in former years.

CUMBERLAND COUNTY, SPRING HILL MINES.

I have inspected these mines 11 times during the year, namely: Jan. 8 and 9, March 6 and 7, April 23, 24 and 25, May 12, 13 and 14, June 4 and 5, July 5, 7 and 8, Aug. 5, Sept. 2 and 6, Oct. 10, Nov. 5 and 6, December 4.

I have found matters at this mine in a satisfactory condition, the air sufficient and the law complied with. A winning stone drift has been driven from the west side of west slope in the new lift to west side of east slope. Mr. Hall has erected a "blow down" fan at the west slope in addition to the one mentioned last year as working on the north slope. A large portion of the air from this fan is directed into the east side of the east slope, which formerly had natural ventilation only. During the year they have sunk the west slope down a distance of 568 feet, and have transferred the underground plant to this new lift, and are now actively operating upon it.

CHIGNECTO MINE.

I have been at this mine 11 times during the year, namely: on January 12, March 4, April 9, May 16, June 6, July 3, Aug. 4, Sept. 5, Oct. 9, Nov. 4, Dec. 3. In January during my inspection I traversed the workings of this mine, and tested the volume of air, which I found satisfactory, the ventilation being only natural. In May the management had completed a new air way, which was attended with beneficial results. During the summer the mine was idle, except keeping the water out and the air circulating. Some repairs were made during the idle time, such as replacing timber and cleaning up the pit, and it is now in good order. In December, 3 or 4 men were at work extracting coal chiefly for country sales.

JOGGINS MINES.

I have visited this mine 9 times during the year, namely: January 11, April 7, May 15, July 4, Aug. 4, Sept. 4, Oct. 8, Nov. 4, Dec. 2.

Some time previous to my visit in April they had stopped the old slope, and have since been working at the new slope. During the year the ventilation, which is only natural, being somewhat slack, the management have materially assisted it in building a small furnace and cupola.

BOSTON MINING CO.

In January 11th there was a small quantity of coal being taken out of this mine for local sales, and on my visit in March work was suspended altogether, and has remained so ever since.

MILNER MINE.

I visited this mine 7 times during the year. A man named John Hurley has been extracting coal from this area chiefly for local sales—from some time in April up to the present time.

SCOTIA MINE.

I have visited this mine 6 times during the year. The operations have been carried on on a small scale; in fact work was suspended for a large portion of the year. A considerable amount of trouble has been experienced on account of the fire in the goaf, so much so that they were forced to open up a new slope. In October I found a few men at work, and the mine looked satisfactory, but in December, on my last visit, I learned that they had driven the new slope into the workings of the old one and had met with a large quantity of damp, but which had in a short time cleared itself. I went through the opening thus made and travelled to the old slope that had been built off when on fire, and found that the fire had to all appearances been damped out, and that Michael Dunn, who has the management of the mine, was extracting the pillars from the old slope.

MINUDIE.

I visited this mine 9 times during the year, namely: Jan. 10, April 8, May 5, July 3, Aug. 2, Sept. 5, Oct. 8, Nov. 3, Dec. 1, and on each of my visits I inspected the mine, and matters appeared satisfactory. A rotary screen has been erected which works well. The long-wall system adopted in this mine appears to suit this seam, as it enables them to extract a large per centage of the coal.

The Debert Mine, spoken of in my last report, has not been in operation during the year excepting some prospecting. A seam of coal near Salt Springs Station, Cumberland Co., has been opened by Clark, Clish & Co. It presents at the opening a thickness of two feet, and increases as it goes to the dip, and at my last visit, on Nov. 7, it had reached a thickness of three feet two inches. The management are erecting machinery, and sinking a slope on it. On their area there are visible indications of four seams of coal, distinct from the one that is being operated upon.

The foregoing is a condensed summary of the visits made by me during the past season. I have also appended herewith a tabular statement of the volume of air in feet per minute circulating in the different collieries, as well as a condensed summary of accidents, fatal and otherwise, which occurred during the past season.

Table shewing the Quantities of Air in cubic feet per minute, as measured by me in the Cumberland and Pictou Collieries, during the year 1884.

COLLIERY.	MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Intercolonial Coal Co. Haltifax McGregor Pit— shaft.. Douglas Seam— slopes.. Acadia Colliery, Westville.. Vale { McBean	Slopes. Nos. 1 & 2.	97,560	97,000	98,200	96,400	90,200	91,000	100,000	98,000	89,000	90,500	97,700	90,200
	Scott Pit..	Idle	during	the	entire	year.	.....	.....	.....	.....	.....	.....	.....
	Slope No. 4.	Idle	during	the	entire	year.	.....	.....	.....	.....	.....	.....	.....
	North side.	25,000	21,000	23,000	24,000	22,620	24,127	15,000	15,300	18,306	21,100	18,955	13,570
	South side.	19,000	13,300	14,000	16,000	17,691	14,192	15,600	14,000	16,066	17,200	12,238	20,172
	No. 1	22,500	21,700	22,720	24,720	21,750	21,850	20,880	21,600	16,506	24,750	24,000	26,250
	No. 2	23,760	22,500	23,400	22,520	20,520	20,520	21,000	21,000	17,200	20,560	20,100	23,200
	1 Slope ...	54,700	54,000	56,000	56,230	65,600	64,600	66,300	59,640	64,400	63,843	65,706	64,600
	1 Slope ...	50,000	47,500	54,000	55,000	53,000	40,000	.....	40,600	50,000	59,000	60,000	65,000
	1 Slope ...	9,000	9,700	13,000	11,550	11,100	12,000	Idle.	10,500	9,000	9,400	Idle.	Idle.
Spr'g Hill { West	1 Slope ...	15,000	.....	21,000	27,200	24,300	18,400	23,600	17,300	19,000	20,000	26,300	28,000
	1 Slope ...	25,000	.....	26,000	32,200	30,100	29,000	27,776	39,400	29,000	31,000	31,931	31,000
	1 Slope ...	19,000	.....	17,500	28,000	26,700	28,000	30,535	26,000	30,000	41,168	36,500	38,300
	1 Slope ...	.....	.....	12,000	9,000	11,700	12,100	.....	.....	.....	Idle.	Idle.	Idle.
	1 Slope ...	18,000	.....	20,000	21,600	24,000	12,250	13,000	Idle.	Idle.	Idle.	Idle.	23,000
	1 Slope ...	6,000	.....	.....	6,325	7,000	Idle.	5,400	3,430	4,280	4,300	4,700	5,200
	1 Slope ...	3,000	.....	2,700	1,300	Idle.	Idle.	Idle.	Idle.	Idle.	1,700	.....	2,000
	1 Slope ...	8,000	.....	Idle.	10,880	11,000	11,550	12,200	13,000	10,240	14,820	13,550	13,100
	1 Slope ...	Idle.	.....	Idle.	.460	Idle.	Idle.	.400	.340	.300	.450	.470	.400
	1 Slope ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

I remain, yours truly,

W. MADDEN, JR.,
Deputy Inspector of Mines.

CAPE BRETON.

BRIDGEPORT, C. B.,

January 3rd, 1885.

E. GILPIN, ESQ.,

Inspector of Mines:

DEAR SIR,—I beg leave to submit the following report on my work as Deputy Inspector of Mines in the Island of Cape Breton.

Sydney Mines.—I have visited this mine ten times during the past year. There is no perceivable change in the underground workings at this mine. Coal is mined, levels and deeps advanced in their usual way. Two miners were injured in their bords by pieces of coal and stone falling on them, also there were two men injured on the surface by the bursting of a locomotive fire box. I enclose you a table showing cause of these accidents, and of all other accidents that occurred in this district for the past year, also tables showing number and dates of visits and amount of air circulating at each visit.

Victoria Mines.—I have visited this mine ten times. The levels on both sides of the slopes have been extended considerably, and headways driven to the rise and back balance placed therein. The engine house and bank have been completed, and the coals are drawn from the slopes by the new engine.

Barrasois Mines.—This mine is situated about half way between the Victoria and Lingan Mines. Work commenced there this summer, and a slope is being driven from the surface through the roof above the coal in the direction of the dip about one hundred feet, where it connects with the seam. The seam is six feet thick, and appears to be a very good quality of coal.

Lingan Mines.—I have made eleven visits to this mine. The working here was chiefly confined to the lower lift, the levels have been driven, and a number of bords broken off. A larger cupola has been built to replace the one that was burned last September.

International Mines.—I have visited this colliery nine times. There has not been much change in the workings at this mine except the drawing of pillars above the line of the upper levels and the splitting of some of the pillars on the second lift.

Reserve Mines.—I have made nine visits here during the past season. The levels in this mine have been extended, headways driven, and bords broken off. A drift is in the course of being

driven from the present seam to connect with the Emery seam that lies below it. The drift is now down about five hundred feet. The Manager says he will strike the coal after extending it four hundred feet further. A young man named Foreman Stubbart and a younger brother had charge of a bord in the mine when the accident occurred causing the death of the former.

Caledonia Mines.—I visited this mine nine times. The underground workings here were carried on in their usual way. The extraction of pillars was carried on very satisfactory, they took nearly all the coal out of them.

Sterling Mines.—I visited this colliery seven times. The coal that was shipped from the mine during the past season was taken from bords already broken off, which have been well timbered and put in good order.

Ontario Mines.—I visited this mine seven times the past year. The little coal that was drawn from this mine during the past season was mined in the second lift on the north side of the slope. The management there failed to get the water out of the dip workings, they have taken up the rails and have drawn up the water pipes. The water has risen as high as the lift the men worked in this season, however before it rose the workings were well timbered.

Block House Mine.—I visited this mine five times. The coal that was shipped here during the past season was taken from the pillars, except a small portion from the deeps.

Gowrie Mines.—I visited this colliery eight times. The western levels were driven a considerable distance and bords broken off. A continuation of the travelling road referred to in last year's report has been extended two hundred yards down to the main level. There have been two over windings of the cage here this season, one in September and the other in November, the cage was caught and held successfully both times at the pulley wheels by the patent detaching hooks. There were no men riding at either time.

You will observe by the tables of air that there is a great difference in the number of cubic feet circulating per minute in a mine, at one visit more than at another. The cause of this is, that when a pit is idle the fires in the furnace are generally neglected, and my record of air circulating is smaller than when they are working. In conclusion I beg to draw your consideration to one thing, that is boys and inexperienced men being given working places in pits. It often happens that a young man from the country starts to work as a loader with a miner for a summer. In the fall, when the work ceases, he returns to his home and comes back the next spring with a loader of his own to one of the mines, and gets work as a miner with his loader, and then gets charge of a working place. The result is this inexperienced miner and his loader make dust of the coal, and are not capable of taking care of themselves. I would suggest that a law be passed not

to allow any person to get charge of any working or leading place in a pit unless he has had three years' experience.

Old Bridgeport Mines.—I have made two visits to this colliery. The shaft is about one hundred and twenty feet deep. It was cleaned out this season. There is a water level from it about $\frac{3}{4}$ of a mile to the sea shore. A headway has been driven westwardly from the pit bottom, and boards broken off right and left. The coal is hoisted to the surface by a small engine and tubs. The management intend driving a travelling road this winter, and putting the mine in good order. A railroad has been completed on the surface, connecting with the International Rail Road.

I am not aware of any other points in connection with the mines in my district that I need refer to.

Number and Date of Visits made by Deputy Inspector to Mines in Cape Breton for the year ending December 31st, 1884.

Mines Visited.	No. of Visits.	DATE OF VISITS.											
		Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines	10	23	.....	27	25	20	14	19	27	23	8	.....	11
Lingan	11	.....	19	26	17	16	12	18	15	12	30	28	15
Victoria	10	.....	20	26	24	.....	13	23	29	24	31	29	17
Barrasois	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15
International	9	16	.....	7	17	24	16	17	18	10	10	.....	10
Reserve	9	25	.....	.....	13	10	21	16	.....	9	7, 24	.....	6
Caledonia	9	.....	.....	5	16	12	10	22	22	13	15	24	3
Sterling	7	15	.....	5	.....	10	11	22	21	15	16	27	4
Ontario	7	.....	.....	.....	.....	23	18	24	14	19	13	25	10
Block House	5	19	.....	15	.....	14	17	10	.....	25	27	.....	13
Gowrie	8	19	.....	15	15	14	17	11	30	26	27	.....	13
Old Bridgeport	2	.....	.....	.....	.....	26	.....	.....	.....	.....	25	.....	.....

*Report of the Number of cubic feet of Air passing through Mines in Cape Breton for the year ending December 31st, 1884,
as measured by me during my official visits.*

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines.....	Idle.	.....	50.320	56.210	54.668	66.560	48.800	52.260	55.500	55.700	.....	64.000
Lingan.....	Idle.	18.000	17.640	.....	26.480	24.000	23.480	18.600	20.000	22.550	23.000	25.300
Victoria.....	10.000	10.200	10.000	15.000	.....	7.560	9.900	10.092	15.000	14.210	.....	15.400
Reserve.....	Idle.	Idle.	.....	.....	30.830	33.000	29.010	22.000	31.300	30.000	.....	23.800
International.....	.....	Idle.	Idle.	20.250	32.600	37.000	36.730	33.000	38.000	36.700	.....	15.000
Gowrie.....	.....	.....	.....	10.000	22.500	27.000	26.000	26.660	27.000	27.500	.....	28.000
Caledonia.....	.....	.....	.....	19.802	33.655	31.500	36.000	36.389	38.130	39.370	.....	15.000
Sterling.....	.....	.....	.....	.....	21.004	12.830	.....	19.000	19.000	20.000	15.000	16.500
Block House.....	.....	.....	.....	.....	25.831	25.000	24.000	.....	25.500	.....	.....	.....
Old Bridgeport.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.000	.....	.....
Ontario.....	.....	.....	.....	.....	.....	10.000	7.900	9.000	8.000	.....	.....	.....

I beg to remain, yours truly,

P. NEVILLE,

Deputy Inspector of Mines.

GOLD.

The returns show that 118,087 days' labor were performed, and 25,147 tons of quartz were extracted and crushed, yielding 16,079 oz., 14 dwts., 10 grains of gold, during the year 1884.

The result of the past year's work again shows an increase in the yield of gold of 632 ounces over the preceding year.

The average yield was 12 dwts., 18 grains per ton of quartz, etc., crushed; this is 1 dwt., 21 grains higher than the average for 1883, and is partly due to the lessened amount of low grade ore crushed in Sherbrooke.

The following mines have worked steadily during the past year, viz.: the Gallagher, Darr's Hill, Brunswick, Oxford and Empress, and have made satisfactory returns. Other mines are getting under way with good promise of steady operations during 1885, among which may be mentioned the Bluenose mine, Montagu, Leipsigate, Rawdon, and Fifteen Mile Stream which it is hoped will yield a return proportionate to its reputation for richness.

Several large lots of low grade ore have been profitably mined, among them may be named 9,799 tons at Salmon River, yielding at the rate of 6 dwts., 20 grains per ton; and 1,679 tons at Renfrew, yielding at the rate of 6 dwts., 18 grains per ton.

The richest yield the returns show is 2,212 oz., 8 dwts. from 913 tons of quartz crushed by the Gallagher Gold Mining Company, being an average of 2 oz., 8 dwts., 10 grains to the ton.

In view of the steady production now maintained by the principal mines, and the promising prospects of several new districts, it is to be hoped that the year 1885 will show a considerable increase over the results recorded for the year just passed.

DISTRICTS.

CARIBOU.—The returns for 1884 shows that 1,559 tons were crushed, yielding 966 ounces as compared with 2094 tons, yielding 477 ounces during the preceding year. There was a little work done by Mr. McDonald near the free claim. The Caffrey mine was unwatered, and the lead found to be four inches thick at a depth of two hundred

feet. The reason given for the abandonment of the mine was the inadequacy of the pumps.

Messrs. Stuart, Gladwin and others opened a lead on Lease 162, near the lake, and sank about 35 feet on it. The measures dip south at an angle of forty-five degrees, and the lead cuts them on an irregular northerly course and westerly dip. It is curiously contorted in the slates, and in several points resembles the vein worked at Oldham, year before last.

At Moose River, Mr. Touquoy worked on Lease 140, on the Little North lode and on the Copper lode, in the spring. Later in the season he sunk 30 feet on the North lead, on the same lease, and worked for some time. The North, Copper, and Little North leads were worked on the Moose River Gold Mining Company's property by tributors. Messrs. Taylor and Walker worked on their areas.

DARR'S HILL.—Work has been steadily continued at this mine, and the extension of the faces has been kept up. The milling facilities have been increased, and the returns show that 9,799 tons of quartz were crushed, and yielded 3,379 ounces, against a return from the same district during 1883 of 7,602 tons of quartz crushed and a yield of 3,885 ounces of gold. The returns from the mine show that up to the close of the year 22,373 tons of quartz had been crushed and yielded 13,123 oz., 7 dwts.

FIFTEEN MILE STREAM.—Mr. R. G. McDonald did a little work on the Orion lead of the Hall-Anderson property during January, and in November the Company resumed work. The mill was fitted with electro-plated aprons, and arrangements made for concentrating the sulphurets.

Mr. James Hudson put up an engine for hoisting and pumping on his area in April. A new lead was found, by tunnelling north from the operations referred to in my last report, and on being opened up showed at a depth of 45 feet, a slate belt three feet wide yielding 24 dwts. per ton. Mr. J. G. Hudson, the manager of the mine, reports that he expects to have their crushing mill in operation before the spring. A little prospecting was done north of the Hall-Anderson property.

GAY'S RIVER.—Messrs. Pulsiver and Holdsworth did some prospecting during the summer, but mining in this district remains at a stand still.

MONTAGU.—In this district the Bluenose Gold Mining Company have continued working the DeWolf areas. They have opened up a lead in the eastern part of their property which is considered to be an extension of the Rose lead formerly worked a short distance to the eastward. Three shafts have been sunk, the main shaft being about 115 feet deep, and they show two leads respectively 10 and 5 inches in thickness. The returns show very good results. About 60

feet to the north a very rich lead is being opened by a shaft now 83 feet deep. This is called the DeWolf lode, and shows two veins 6 and 4 inches thick, which with two inches of intercalated slate yield one foot of crushing material. Mill tests have shown it to run 4 ounces to the ton. This mine promises to bring the district again to the front as a good field for work, and is fully equipped with an 8 stamp crusher, houses, whims, pumps, etc.

Mr. Gladwin did some work on the British American areas adjoining to the eastward, and proved the continuation of the veins referred to above.

The concentrator noticed in my last report worked for a short time during the summer.

OLDHAM.—Mr. A. McDonald sank on a barrel lode, from one to twelve inches thick, at the rear of the Stirling properties, to a depth of about 100 feet and carried a stope to the westward. Messrs. Fenwick, E. C. McDonald and others did some tribute work.

In the fall Mr. J. E. Hardman made arrangements for working the Lowell, Fraser, and Baker properties together, and is successfully mining a slate belt carrying low grade ore. It is proposed to re-open the main shaft on the Baker lead and to sink it to the point of intersection with the regular lodes of the district. The returns show 824 oz., 15 dwts., 12 grains from 921 tons of quartz.

RENFREW.—The returns show a yield of 1,679 tons of quartz and 569 oz., 18 dwts. of gold from the Empress mine, under the management of Mr. A. A. Hayward. The work commenced last year has been systematically carried on. The main shaft is being sunk 100 feet further to open a fresh lift. The hoisting and pumping appliances are well planned, and work very satisfactorily.

It may be mentioned here that part of the road from Enfield station to the mines has fallen into bad repair, and it is to be regretted that no steps have been taken to improve it.

A little prospecting has been done at a few points in the district.

SHERBRROOKE.—The returns show that 3,268 tons of quartz were mined and crushed with a yield of 2,668 oz., 11 dwts., as compared with 8,470 tons of quartz, giving 3,356 oz., 18 dwts., 17 grains during the preceding year. The highest returns were made during March when they showed 380 oz., and the lowest were 99 oz., in September, probably the smallest ever recorded from this district.

The Pactolus worked a small lead on the Rockville property, and Mr. D. R. Cameron worked its extension in the Gold Hill property, but it was soon abandoned. The large belt in the Pactolus was allowed to fill with water. A new lead was opened on the Wellington

property, a few feet north of the Dewar lode, but it did not come up to expectations.

Mr. Williams worked the Hayden and Derby and the New York and Sherbrooke properties, and at present this is one of the best paying properties in the district.

Some work was done on the Alexandria and Dominion areas. Messrs. McNab and Sinclair did a little work on the Caledonia property in the fall.

Most of the crushing of the past season was done in the Goldenville crusher, which was used as a custom mill.

The mining in this district is mostly on the tribute system, a rent of ten per cent. of the gold production being paid to the owners of the property. This coupled with the royalty forms a heavy tax on the adventurers. It is stated that many leads in the district, now lying unworked and filled with water, would be opened if they could be taken at a low rent.

COCHRAN'S HILL.—This district has not been worked during the past year. It is one that promises well, as gold can be readily found over a considerable area, but hitherto no systematic mining has been carried on.

STORMONT.—Operations in this district have been practically confined to the property of the Gallagher Gold Mining Company. They have extended their workings from the main shafts. The returns show that 913 tons (including some old dumps) were crushed, and yielded 2212 oz., 8 dwts. The total returns from this mine now show 1,978 tons crushed, and a yield of 5,034 ozs.

UNIACKE.—Mr. Davidson continued working on the hill until the fall, and attained a depth of 275 feet. Horses were used for hoisting, and at present operations are suspended, until an engine is put up.

Mr. Prince took out some lots of quarts from the Uniacke and other areas, and tribute work was done on the Montreal, Union, and other areas. The returns show a yield of 2235 tons of quartz, and 1140 ozs., 6 dwts, 2 grns. of gold as compared with 2,809 tons and 1,197 ozs. during 1883.

UNPROCLAIMED AND OTHER DISTRICTS.

YARMOUTH.—Some prospecting was done at Chegogin Point, and near Cranberry Head. At Kemptville, about 23 miles from Yarmouth, Messrs. Ryerson, Reeves, Cowan, and others did a good deal of work, and are making arrangements for erecting a crusher. A number of leads from four to eighteen inches in thickness were exposed and

traced for several hundred feet. Some of these leads shows gold, and the district is worthy of further attention. It is in measures in every way similar to those proved auriferous to the eastward, and ample water power can be had within a reasonable distance.

Discoveries of gold were reported from several points between Annapolis and Liverpool.

LEIPSIGATE LAKE.—The operations of the Messrs. Hall and Owen show a return of 130 tons crushed in the fall, yielding 410 oz. Fifty tons of which gave 250 ounces. It is to be hoped that this promising district will rank next summer among the best of the provincial mines. A crusher of ten stamps, driven by steam, has been built near the cross lead.

INDIAN PATH.—Here the main shafts on the big lead have been pumped out and put in thorough repair. About 20 tons of quartz have been taken out for a trial crushing. A new mill of 10 stamps, with all necessary fittings, was built by Mr. Henry Archibald. It is driven by steam, and it is expected that work will shortly be started.

RAWDON.—Promising developments were made here during the spring by Messrs. Simms and White on a lead four to seven inches thick, and on a belt carrying several leads from fifteen to twenty-five inches thick. A ten stamp mill was put up during the summer and the returns show that 217 tons were crushed yielding 241 oz., 7 dwts., 11 grains. This district is in an isolated position, but being in the auriferous measures of the Province, and showing good results, it merits more attention than it has yet received.

STEWIACKE.—The mill on the south branch was rebuilt, and a few tons of the low grade ore at the Saw mill were crushed. About three miles west of this point some prospecting was done by Mr. Chandler in conglomerate.

CHEZETCOOK.—In this district operations have been principally confined to the property of the Oxford Gold Mining Company. The returns show that 2,464 tons of quartz were crushed during the past year, and yielded 1,887 oz., 18 dwts., making the total returns 5,479 oz. from 4,550 tons of quartz. Mining has been carried on in the Mill and Coleman lodes to a depth of about 100 feet. Hoisting power, etc., is carried to the shafts by wire rope from the mill house, where additional engine power has been put up. The surface arrangements have been improved, and additional accommodation provided for those engaged about the works. The property has now one of the best mining plants in the Province, and its history has hitherto been a very successful record.

It is to be regretted that no regular work has yet been started on the other auriferous lodes of this district, as it promises to be one of the best in the Province.

COPPER.

During the past summer Mr. A. C. McDonald did some prospecting on a copper vein at Scott's Hill, Pictou Co. A little work was done at the Margaretville Copper, Annapolis Co. Here native copper and carbonate is found in the joints of the trappean ash, and the indications would appear to warrant further development. A few tons of copper is reported to have been extracted from one of the Pugwash deposits of gray copper ore. In this connection the developments being made at Dorchester, in New Brunswick, lead to a hope that some of these upper carboniferous deposits may have value in Nova Scotia.

Near Antigonish a deposit of copper ore was said to have been found in the fall. Some work was done near Whyhogomah on a vein of copper pyrites in a diorite band.

In the Ohio district an opening was made on a deposit of yellow and gray copper ore, yielding 1,120 lbs. of copper, $6\frac{2}{3}$ dwts. of gold, and 3 oz. of silver to the ton.

COXHEATH.—During the past year about 275 feet of drifting have been made to the north and to the south in the 190-foot level. During the progress of this work about 100 tons of 8 per cent ore were taken out. In addition to proving the continuity of the vein of ore found in the 140-foot level two new and promising veins were cut, which yielded about ten tons of 10 per cent ore from the exploratory drifts. One of the veins yielded some 30 per cent ore. The result of the exploratory work carried on under the superintendence of Mr. VanSlooten are stated to show in sight about 1,000 tons of ore between the 140 and the 190-foot levels, running from 5 to 10 per cent of copper, with good promise of continuity in depth.

The following estimate of Mr. Van Slooten would show that copper matte can be produced at Sydney under very favorable circumstances.

Assuming that 7 tons of 5 per cent ore will make one ton of 32 per cent matte, and a daily output of 50 tons:

Mining, dead work and transport to tide-water of one ton of ore		\$2.50
Smelting	{ Coke, $\frac{1}{6}$ of a ton, \$1.50	0.25
	{ Iron ore, $\frac{1}{3}$ of a ton, @ \$1.50	0.67
	{ Labor	0.25
	{ Superintendence, oil, coal, etc.	0.25
Freight to Swansea, 1-7 ton of matte, @ \$5		0.72
Port charges and storage, 1-7 of \$1.75		0.25
Commissions, assays, etc.		0.72
Total		\$5.61

Which would leave a good margin even at the present low prices of copper.

IRON.

STEEL COMPANY OF CANADA.—During the past season the company continued working the East and West Mines. Preparations are being made for sinking below the No. 7 level, and an underground engine will be used for raising ore from the deeper workings. The company finding that they had large quantities of "Spathic ore" available in addition to the limonite which has hitherto been exclusively smelted, have begun to use it in their furnaces.

This mineral also known as Sideroplesite (classed by Dana as a variety of ankerite) is I believe found in few places in quantities making it valuable to the iron smelter. In general terms it may be described as ankerite with its calcic carbonate replaced by ferrous carbonate. Mr. Henry Louis, late analyst to the Steel Company of Canada, gives the following analysis of it, which shows that it is an important source of iron:

Insoluble silicious mater .....	.47
Calcic carbonate .....	.59
Ferrous "	69.20
Manganous "	1.37
Magnesian "	28.73
Ferric oxide .....	.08
	100.44

At first this ore was found in the West Mines mixed in strings and veinlets in ankerite, as the workings were deepened it became freer from ankerite; which at many points is present in very small amounts. The extensive deposits of this ore in the mine warrant the expectation that it will prove of much future economic value. Kilns have been erected for calcining it before it is introduced into the furnace. The returns of the mine shows that 54,885 tons of iron ore and 5,799 tons of ankerite were extracted during the past season.

On the East River, Pictou Co., some explorations were made on the farm of Mr. W. Grant by the Steel Company of Canada; and at other points by Mr. R. P. Fraser of Pictou. It is greatly to be regretted that no successful attempts have been made to utilise the large and varied iron ore deposits of this county.

Discoveries of iron ore were reported from Lorne, Pictou County, Whyhogomah, Inverness County, and Malvern, Annapolis County. Near Digby some prospecting was done on small veins of Magnetite in the Triassic Trap near its junction with the underlying sandstone. Analyses of the ore are said to show:

Iron	60.430
Silica	14.320
Phosphorus .....	.036
Sulphur .....	.046
Titanic Acid	none

ANTIMONY.

During the past year a valuable mine of antimony ore has been opened out at Rawdon, Hants Co. Two shafts, about 120 feet apart, have been sunk about 175 feet, and levels driven, and 600 tons of No. 1 ore raised. The vein, which is of gray antimony ore, is from 4 to 18 inches in width, cutting talcose slates. There is little impurity present beyond small amounts of quartz and calcspar. An analysis by Mr. M. H. Smith, made in Dr. Lawson's laboratory, Dalhousie College, showed the ore to be almost of chemical purity, having little beyond mere traces of foreign material.

This discovery has led to prospecting for other deposits of the ore, and it is probable that a large district here will be found to yield it. Similar ore has been reported from Upper Stewiacke.

As this ore is new in Nova Scotia, and may prove a source of profitable mining and smelting, I add a few remarks on it which may be interesting.

The metal antimony is occasionally found native. It occurs sparingly in this form at the Prince William Mine in New Brunswick, and is met in veins of silver and other ores in the Hartz and in Mexico. Its color and streak are tin white, and it is usually presented in the massive form with a distinct lamellar structure, which serves to distinguish it from native bismuth. The latter metal is of a silver white color with a tinge of red, and nearly as heavy as lead, while antimony is a little more than half as heavy. Native bismuth is as hard as crystalline gypsum (soft gypsum), while the hardness of antimony approaches that of anhydrite (or hard plaster.) Both these metals fuse and evaporate at a low heat.

The chief source of the metal however is stibnite, sulphuret of antimony, or gray antimony ore. This has a lead gray color and streak, and a shining lustre. It is brittle and usually columnar or fibrous. When heated in a candle flame it fuses readily, and before the blow pipe on charcoal it is absorbed, giving off white fumes and a sulphur odor. It resembles the common lead ore (galena) in color and lustre, but is distinguished by its extreme fusibility, and by being little more than half as heavy. The hardness of stibnite, that of soft gypsum, is slightly less than that of lead ore. There are a number of combinations of sulphur with antimony and lead resembling the gray ore, which fuse easily and give the reactions for antimony and lead.

Another mineral frequently found in this Province, which resembles antimony ore is the Sulphuret of Molybdenum. It may, however,

be distinguished by its extreme softness, permitting of its being indented by the finger nail, and by its feeling somewhat "greasy," like the purer forms of graphite. Antimony ore when pure contains in round numbers seventy-three per cent. of antimony and twenty-seven of sulphur. All ore carrying above forty per cent. of metallic antimony is classed as No. 1, that of a lower per-centage is ranked as No. 2.

Antimony ore is found in veins in rocks of varied age, and is frequently associated with ores of silver, gold, lead, iron, arsenic, etc. It occurs in the granitic and crystalline schists of Auvergne, Hungary, the Hartz, and Bohemia, and has been worked to some extent in Cornwall. In the United States several rich deposits are known on the Pacific Slope, but the distance from New York, the principal market, has as yet rendered all attempts at its reduction unsuccessful. In 1882 the amount reduced in the United States was about 60 tons valued at \$12,000. The annual consumption of the metal in the Pacific Coast is estimated at 25 tons.

The returns of the mines inspectors for 1883 show that it is not now mined in England. Upper Sarawak in Borneo is one of the chief sources of this ore, but the supply seems to be decreasing for the amount exported in 1883 was 1,361 tons against 1,856 tons in 1881, and 1,440 tons in 1882.

In New Brunswick the ore is found in strata of lower silurian? age, and has been intermittently mined and smelted during a number of years. The age of the strata holding the Rawdon antimony ore is not yet known from any survey, but it may provisionally, from their relation to the Rawdon auriferous strata, be considered lower silurian.

The ore is readily smelted and forms several alloys of great commercial value. It is used in making "type metal" which is said to contain one part of antimony to six of lead, and a little tin and bismuth. This alloy expands a little on cooling, and ensures a sharp, clear letter. Britannia metal which is superseding "pewter" contains 100 parts of tin to 8 of antimony, and either $2\frac{1}{2}$ parts of each copper and brass, or 2 parts of copper and bismuth. An alloy of tin with antimony forms the metal on which music is engraved. Glass of antimony is a mixture of sulphuret and oxide formed by partial reduction and fusion of the former. Babbit metal, well known for its use for machinery bearings, etc., consists of 83.3 parts of tin, 8.3 of copper, and 8.3 of antimony.

GYPSUM.

The total exports were 11,068 tons, against 144,688 tons during the preceding year. Mr. E. O'Brien, the Collector of Customs, attributes the falling off in the exports from the Windsor district to the Presidential election in the United States, and it is anticipated that the exports during the year 1855 will resume their normal volume.

At Windsor operations are carried on almost exclusively by Mr. Edward Dimock, who has, I am informed, combined the various quarries in the St. Croix River. During the past season he has replaced the horse tramway from the quarries to the river by a railway of standard gauge, equipped with a locomotive and a set of self-tipping five ton cars. The openings into the various quarry faces will allow readily of a daily shipment of 500 tons of gypsum. The amount shipped from Windsor last year was 80,072 tons. The quality of much of the rock was very good.

The New York Plaster Company reopened the old quarry at Grandique Ferry, Richmond County (said to have been worked by the French during the occupation of Louisburg), and built a wharf. It is expected that a considerable trade will be done during 1885.

The Messrs. McCurdy of Baddeck did not ship from their quarry on Baddeck Harbor, but sent away 2,795 tons from another quarry at St. Anne's, chiefly to Quebec.

MANGANESE.

The total produce of manganese ore during 1884 was 302 tons. Mr. J. W. Stephens continued working his mine at Tenny Cape, and small lots were mined at Cheverie.

At the East Mountain, near Truro, Messrs. Stevens and Carter took out about 30 tons of very good pyrolusite from the drift, and have, it is reported, found the vein which they consider to have yielded the drift ore.

At Loch Lomond, in Cape Breton, Mr. E. T. Moseley has continued working the Moseley manganese mines, and states that he is prepared to supply high grade ore, guaranteed 90 per cent of binoxide. He has put up machinery for hoisting and pumping, and done preliminary work.

LEAD, ETC.

SMITHFIELD.—One hundred tons of ore, averaging about 40 per cent of lead, were taken out in the fall, and a small smelter erected. The ore was burned in heaps, and it was found that calcination was not carried far enough. Calciners were then put up, and after proper roasting the ore was found to be self fluxing. The inception of this undertaking is extremely interesting, as the establishment of lead smelting will mark a new departure in the mining industries of the Province.

ACCIDENTS.

During the year 1884 the following Fatal Accidents occurred in Nova Scotia Mines.

No.	Date.	Name of Mine.	Name of person killed.	Occupation.	Remarks.
1	January 12..	Albion	James McLellan	Trapper	{ Left his door and was killed by the rake striking him.
2	March 7	Acadia	Peter Gillis	Loader	Fall of coal.
3	August 20 ..	Spring Hill	Frederick Crocker	Miner	{ Attempted to get on water-box, and was jammed against timber.
4	October	Reserve	Foreman Stubbett	Miner	{ Coal parted from lype while he was shearing.
5	November 4.	Albion	William Campbell	Miner	{ Premature explosion of shot from use of iron tamping-bar.
6	November 22	Sherbrooke	Andrew Stearns	Miner	Improperly thawing dynamite.
7	November 29	Londonderry ..	{ Richard Perry	Miners	{ Shaft of winding-engine broke, and they were thrown down the pit.
			Thomas Vigend.....		
			Nathaniel Rushton		
			Olive Rushton		

I would remark, with reference to the foregoing accidents :

1. This boy was employed on one of the McGregor slants, and provided with a safety hole, and with a rope to open the door. From the position he was found in after the accident it was evident that he had left his post.

3. This accident occurred as a direct violation of the special rules. From Mr. Madden's investigation into the accident it appears that he had endeavored to get on the iron water tank as it was being drawn out of the sump, and, failing to do so, was caught between the tank and some timber. The injuries he received proved fatal after a few days.

5. The death of William Campbell, who held a certificate of competency as underground manager, and the severe injury of his partner, arose from his iron stemmer igniting the charge. A similar accident, fortunately unattended with fatal results, befell George and Cyrus Simpson, in the Springhill Mines, November 21st. On the 9th of June Donald McKay was similarly injured at the Albion Mines, and another accident of the same character occurred at these mines early in the season.

7. This accident, by which John McInness and Samuel Chisholm were also severely injured, happened at the Dufferin shaft, which is two hundred feet deep. The engine had been working as usual during the morning, and after the dinner hour a party of six men started to go down. The drum barrel jumped from its position and the cage became uncontrollable; about the fifth level it appeared to have entered the slides, and the men fell the remaining distance of nearly 25 feet. The cause of the accident was the fracture of the drum shaft at the centre bearing. The shaft, which was a new one, and amply large for the weight, proved on examination to have had a flaw; but it had evidently been severely strained, as it was partially twisted. It has been conjectured that the cage might shortly before the accident have struck the timber in the pit and been strained, thereby causing a weakness which resulted in fracture. The flaw had not been detected during the turning of the shaft.

This accident recalls, in many particulars, the slope accident at the Vale Colliery, and the discovery of a reliable method of testing ropes, bolts, bars, etc., would prove a great boon.

There were five cases of fractured limbs from fall of coal—nearly all from coal loosened by shots. Several persons were injured by riding on rakes and back-balances, and in some cases narrowly escaped with their lives. It is strange how men will try to steal a ride to save themselves a safer, if more tedious, journey on foot.

A trapper boy in the McGregor pit left his door and obtained some powder, which he fired by a light he got by opening his safety lamp, and was severely burned. Two boys playing in a somewhat similar

manner managed to set the Vale Colliery seam on fire; fortunately the fire was put out before any damage was done.

I may remark that, so far as I am aware, no accident of any kind occurred from ignition of fire damp.

MISCELLANEOUS.

The following is a list of the men who have received certificates from the Board of Examiners:

CERTIFICATES OF COMPETENCY—UNDERGROUND MANAGERS.

Thomas Scott.....	Springhill.
Henry Swift	"
Thomas Routledge	Sydney.
Hugh Campbell.....	Cow Bay.
James Baird	Chignecto.
J. G. S. Hudson	Stellarton.
James Maxwell	Westville.
Alex. McInnis	Springhill.
F. Burrows.....	Springhill.
F. Park.....	East Mines, Debert

OVERMEN.

Alex. McDonald.....	Stellarton.
James Rogers.....	"
George Wilson	Chignecto.
A. L. Edmunds	Cow Bay.
Ed. Wilkinson	Stellarton.
John Weir	"
W. Reese	Springhill.
M. Dunlap	Chignecto.
W. Lorimer	"
Allan C. McKinnon.....	Springhill.
John Maxwell	Stellarton.
Allan Caldwell.....	Sydney Mines
A. D. McKenzie.....	Stellarton.

CERTIFICATES OF SERVICE—UNDERGROUND MANAGERS.

John Dunbar	Stellarton.
R. Redpath	Minudie.
R. Wilson	
W. Conway	Springhill.
A. Purvis	Westville.
M. Walters	Glace Bay.
Henry Morley	Cow Bay.
John Johnstone	Bridgeport.
John Douglas	Stellarton.
Thomas Turnbull	Vale Colliery.
George Scott	Caledonia.
Joseph Simpson	Sydney Mines.
W. McNamara	Lingan.
P. P. Burke	Joggins.
A. L. Anderson	Cow Bay.
W. Adamson	Glace Bay.

OVERMEN.

William Young	Lingan.
Angus McKeigan	Bridgeport.
George Kay	Sydney Mines.
J. B. Greenwell	" "
John McKay	Stellarton.
Thomas Johnston	Cow Bay.
T. Fletcher	Reserve.
James Johnstone	Westville.
Ed. Harris	"
J. Bradley	Springhill.
Mat. Spoors	Vale Colliery.
W. Stafford	N. W. Territory.
D. Hayman	Westville.
Jas. Findlay	"
Jas. Hunter	"
J. J. Duff	"

The candidates who presented themselves last year were chiefly overmen holding certificates of competency and desirous of advancing themselves to the position of underground manager. The papers showed that much care and trouble had been taken by the candidates; but they were deficient in one branch, that of surveying, although the standard in this was not high. It is impossible for men to get any knowledge of surveying as applied to pit and colliery purposes unless they are taken by the hand and taught it practically. I may say for myself, as a member of the board, that unless readily accessible means are provided for some candidates of instruction in surveying and the elementary principles of mining, I feel that the work of the board will not prove satisfactory.

THE EMPLOYMENT OF COMPRESSED AIR IN VENTILATION.—The use of fans and blowers for driving places off the air is well known. Hitherto all attempts to utilize compressed air, etc., for driving these machines have proved expensive and unsatisfactory in coal mines, although compressed air, intended primarily for drilling, has been found a useful adjunct to ventilation in metalliferous mines. Experiments have been made in Germany which show that the direct use of compressed air may be found advantageous under some conditions of coal mining. A plant compressing air up to four atmospheres furnished a supply equal to the ventilation of forty-five working places. The air was carried in zinc tubes and delivered through an aspirator. The total delivery of air was 15,500 cubic feet.

SAFETY LAMPS.—The recent enquiry made by the Midland Institute of Mining Engineers into the comparative efficiency of the best known safety lamps, presents many points of interest to coal miners. It was found that in an explosive current travelling at the rate of from 6 to 14 feet the ordinary Mueseler, the Clanny, the Davey, the Stevenson, the Thompson and the Bainbridge lamps, were unsafe. Further experiment showed that the improved and protected Mueseler, the Routledge and the Johnston and Purdy lamps were safe until the current reached a velocity of 19 feet per second, when the Mueseler lamps exploded by an oblique ascending current. On increasing the current to 35 feet the lamps that proved the best were those of the Smethurst type (fitted with a bonnet), the improved and protector Mueselers, and the Routledge and Johnston.

COAL BANKING.—Where the shipment of coal cannot be carried on continuously throughout the year, as is unfortunately the case with most of our coal mines, recourse must be had to banking out the product of the pit. The loss arising from the repeated handling, and the disintegrating effects of our changeable climate, frequently make the operator hesitate to work his mine when he cannot see any chance of immediate shipments. Attempts have been made to "bank" coal underground in the working places, but it does not appear that any decided advantage is gained. When large amounts of coal have to be shipped rapidly from a mine working up to its capacity the underground stores of cut coal cannot be largely drawn upon without interfering with the regular work of the pit, while the surface bank can generally be utilized to any desired extent. In this connection the following account of a cheap and readily available plan for lessening the breakage of bank coal taken from the *Engineering and Mining Journal* may prove interesting to our managers of coal mines:

Wenzel Koech, of Karbitz, Austria, argues that if coal is placed in an atmosphere of steam, which excludes oxygen from the coal, the hygroscopic water will have no tendency to leave the pores of the coal, nor can a chemical action set in, even in the presence of pyrites, the oxidation of which is, under other circumstances, essentially promoted by the presence of moisture. It is, therefore, not to be doubted that, by displacing the oxygen and keeping the coal moist, alteration

and spontaneous combustion may be checked. A complete immersion would meet the requirements, but would only be practicable in rare cases. Wenzel Koech excludes the air and produces a uniform wetting of the stored piles of coal by admitting spent steam into them. For this purpose a series of trenches are cut in the ground; they are so covered with beams and boards that narrow spaces remain, not large enough to permit the coal to fall through. The boards are simply laid on cross-pieces, are not fastened, and can be easily removed for the purpose of cleaning out the trenches. On the ground thus prepared the coal is deposited in the usual way; the trenches are then connected with the exhaust-pipe of a steam-engine, and the steam admitted; it passes through the interstices in the covering into the coal-pile, disseminates itself through the latter, displaces the air, and, in consequence of the condensation of the steam, moistens the coal. In order to effect a uniform distribution of the steam it is necessary to cover the coal-pile with fine coal and cinders, as in the case of charcoal heaps, whereby strong draughts of air will be prevented from passing through the pile and interfering with the equal distribution of the steam. In the case of coal containing little pyrites careful covering of the coal is not so necessary, but it is of importance in the case of coal rich in pyrites. The distance apart of the trenches in large heaps of coal depends upon the sizes of the pieces of coal to be stored and the height of the pile; for medium-sized coal the distance between the trenches with a height of pile equal to 10 feet is 10 feet. The exhaust-steam of a steam-engine of 4-horse power, which worked but six hours during the day, was entirely sufficient for the preservation of a depot of 20 carloads of coal.

In carrying out the process it was repeatedly shown that the losses sustained in the unloading of the coal are far smaller than they are usually assumed to be, and that in this assumption a large portion of the waste produced by attrition was attributed to the destruction in dumping. In the loading of the coal preserved by steam it was found invariably that only in the locality where the first unloading took place, and where the coal fell from greater heights, attrition took place; the rest of the coal was good, was well preserved, and could be loaded without re-sorting. The cost of construction of the trenches and their covering—for which latter old and otherwise useless boards, timbers, and ties of the mine are utilized—for a dump of 100 carloads of coal amounts at most to \$12.50. The cost of working is nothing, and the outlay consists only of the cost of preserving the trenches, and the interest and sinking fund on the capital invested.

Results relative to the use of this process have been obtained at several mines. At the Ferdinand shaft, belonging to the Austrian Coal Industry Association, confirmation of the described preservation method was quite accidentally found. Over a reservoir covered with debris, and into which exhaust-steam passed, coal had been deposited, which, on reloading, was found to be perfectly preserved. According to communications from mining engineer Hans Gutmann, further experiments were carried on with favorable results, and the working

of the process on a larger scale was proposed. The director of the Bruno mine uses old gratings to cover the canal. He also subjected coal, without covering with cinders, for more than two months to exhaust-steam, and found it in no way altered.

SHOT-FIRING IN COAL MINES.—Enquiries recently made by the English Government confirm the opinion that shot-firing is the source of most explosions; and it has been proposed to confine shot-firing to the time between shifts, and that during the progress of the blasting the shot firers only should be in the pits. This would prove undoubtedly a great safeguard, but in many mines the precaution would appear too great, so far as gas is concerned, provided that the preliminary examinations were properly conducted.

The effects of coal dust, however, must not be overlooked in this connection. The extension of gas explosions appears to be due in some instances to the almost impalpable dust of dry mines; and recent experiments at Koenig Colliery, near Saarbrucken, show that some coal dusts are capable by themselves of extending shot flames and producing considerable explosions.

At this colliery a drift was made, 167 feet long, in an old rock dump, timbered with double T iron, and lagged with two-inch plank. The drift was covered on all sides except the top, where thirty small bull's-eyes were inserted so that the drift could be examined during an explosion. The face of the drift was made of solid masonry into which seven small mortar guns were built. Two of these were near the roof and laid to strike the floor of the drift 33 feet from the face; three were placed in the middle of the face, so that they would hit the floor at a distance of 16 feet; the rest were placed near the floor.

A gun holding a charge of 8 oz. of powder, with clay tamping, was fired, and gave in the ordinary atmosphere a flame 10 feet long. The same charge, when tamped with fine coal, gave a flame 26 feet long.

When the floor of the drift was covered with a layer $1\frac{1}{8}$ inch in thickness of fine dry coal from the Union Colliery, the shots gave, with clay and coal tamplings respectively, flames 18 feet and 31 feet long, showing that this coal dust did not appreciably affect the length of flame. When, however, a similar test was made with coal dust from the Pluto Colliery, where several explosions have taken place, flames were produced 190 feet long, and a strong explosive force developed. As the drift was entirely free from explosive gas the results of these experiments, which were many times repeated, would show that the manager of a dry coal mine should acquaint himself with the effect of blown-out shots on the dust of the mine under various conditions.

It will probably be found that there is some chemical rule of composition, or some state of aggregation, rendering certain coal dusts liable to ignition. The experiments should be extended to test the effect of different velocities of *air* in carrying coal dust, and trans-

mitting its flame; and to the comparison of the inflammability of fresh dust, and of that exposed to the atmosphere for some time.

PIT ROPES.—The following remarks taken from a paper recently read by Mr. R. I. Frechville, H. M. Inspector of Mines for Cornwall, will prove interesting to miners. He says:

Of all mining operations none is more important than that of winding, or has undergone more changes or improvements during the last quarter of a century, especially in the coal fields, where, in consequence of the increased depth and enormous output of the mines, great attention has been bestowed on this branch of mining engineering. In some instances from 1,000 to 1,500 tons of coal are drawn from a single pit in a day, the cages running at a speed in the shaft of from 1,500 to over 2,000 feet per minute. This result is due not only to the shafts being perpendicular, and powerful engines being employed, but also to the marked improvement of detail in the appliances used.

The rope to be used is a matter of the first importance, especially in those cases where the security of human life is dependent on its efficiency. The essentials of a good rope are flexibility and strength, combined with the least possible weight. Experience has shown that in the majority of cases these requirements are best fulfilled by round steel wire ropes. Iron wire ropes are fast going out of use, owing to the larger sizes required for given strengths, with consequent increase of dead weight to be subtracted from the useful load. It must, however, be borne in mind that, where the water contains much acid, the injurious effect of this on a steel wire rope would be greater than on an iron wire rope.

The physical properties of steel largely depend on the proportion of carbon combined with the iron, the addition of carbon increasing the hardness and ultimate strength, while the ductility and power of resistance to shock and sudden stress diminish. The softer kinds of steel, however, which contain least carbon, approach wrought-iron in character, having equal toughness, greater strength, and the same capacity for welding. The milder steels contain from 0.15 to 0.4 per cent of carbon, and the hardest from 1.4 to 1.6 per cent. The following are the breaking strains per square inch of wire of some of the most usual varieties employed in rope-making:

Mild steel.....	from 40 to 50 tons.
Best crucible steel	" 50 " 60 "
Best patent steel.....	" 70 " 80 "
Best plow steel	" 110 " 120 "

Too great stress cannot be laid upon the necessity of having ropes constructed of the best material. The selection of the material however, somewhat depends on the conditions of working. Thus, with a perpendicular shaft and large drums and pulleys, a plow-steel wire rope will be found the most reliable; but with small drums and pul-

leys, and a shaft with angles in it, a rope made of best patent steel or mild steel will last longer, as the wires are not so apt to snap in bending. In describing a wire rope, the number of strands, the number of wires in each strand, their gauge, the quality of metal, and the material of which the centre or core is composed, should be specified.

Now as to the gauge, since the ultimate strength of wire increases as its diameter decreases, and since small wires are more pliable than large ones, it would seem that the finer the wire used the better; but there is a practical limit to this, as very fine wire offers too much surface to oxidation, and is too easily injured by friction. Experience has shown that it is advisable to employ medium sized wires, between Nos. 10 and 15 of the Birmingham wire gauge. For ordinary work hemp cores or centres have been proved the best; they stretch with the strands, allow the wires to bed themselves solidly, and give ropes greater flexibility than could be obtained with wire centres. The latter have not given very satisfactory results in practice, although a greater breaking strain is obtained with a relatively smaller rope.

There are many modifications in the methods of laying or twisting the wires. Common laid rope has six strands with seven wires in each, the size of the wire being altered to suit the size of the rope. Compound ropes, that is, ropes with more wires in the strands than in the usual construction, in addition to other varieties, have six strands with 19 equal sized wires in each, or seven strands with 6 wires in the middle of about 15 gauge, and 12 round the outside, alternately 15 gauge and 12. Ropes with six strands of 11, 12, and 13 wires each are frequently manufactured. Some makers prefer the inner wires of each strand smaller, so as to be more flexible than the outer. Six strands in a rope are better than four or five, as they make it more cylindrical, and consequently the friction is better distributed. Six strands of 19 wires each make very durable ropes. These work better than one of equal size composed of 6 or 7 wires in a strand, as the latter, being larger and less pliable, are more liable to snap in passing round pulleys and drums. When three or four of these wires break near together the rope is hardly fit for work, whereas the breakage of small wires would be of much less consequence. More material can be got into the same sized rope when compound instead of common laid, as the smaller wires do not leave so much space between each other.

On account of the many different sizes of steel wire employed in the manufacture of rope, and the varying sizes of the hemp centres, and the empty spaces above referred to, it is impossible to state a formula for determining the dimensions of a steel wire rope to bear a given strain. As the nature of a wire rope, however, is defined by the number and size of the wires, it is easy, if we know the section and weight per fathom of the gauge employed, to determine the effective sectional area of the rope and its weight per fathom; given, then, the quality of the metal, the breaking strain of the rope can be approximately estimated.

The following table, in which the numbers of the Birmingham wire gauge most usually employed in the construction of mine ropes, are compared with inches, and the weight of a cubic foot of steel is taken at 487 pounds, will be found useful in these calculations:

No. B. W. G.	Diameter in inches.	Sectional Area in square inches.	Weight per fathom in pounds.
10.....	.137	.01474	.2990
11.....	.125	.01227	.2489
12.....	.109	.00983	.1893
13.....	.095	.00708	.1436
14.....	.083	.00541	.1097
15.....	.072	.00407	.0825

Thus in the case of a steel wire rope composed of six strands, 7 wires in each, of 10 gauge, the effective sectional area will be $6 \times 7 \times .01474 = .61908$ square inches, and its weight in metal, and its weight per fathom in metal $6 \times 7 \times .2990 = 12.55$ pounds. If best plow-steel wire with a breaking strain of 120 tons per square inch is employed in its manufacture, then $.61908$ the effective sectional area $\times 120$ tons = 74.28 tons, and deducting $\frac{1}{8}$ for lay, we obtain 65 tons as about the breaking strain of the rope.

Again, let us suppose a compound rope made of the best patent steel wire with breaking strain of 75 tons per square inch; and composed of six strands of 19 wires each, 13 gauge. The following calculation— $6 \times 9 \times .00708$ sectional area of each wire by 75 tons breaking strain per square inch of wire, less $\frac{1}{8}$ per lay, gives us 52.97 tons as the approximate breaking strain of the rope. Such a rope, with hemp core and fairly made, would weigh about 18 pounds per fathom, and have a circumference of about $4\frac{1}{2}$ inches. The actual breaking strain, however, can only be found out by testing sample lengths of the finished ropes.

As the operations of manufacture introduce so many elements of uncertainty in wire ropes it is well to allow a wide margin of safety, especially where their breakage would endanger life, and to take the working load as one-tenth of the ultimate strength of the breaking strain. The weight of the rope hanging over the pulley at the poppet-heads is of course included in the working load. In very deep mines this weight, even with steel wire ropes, becomes a matter of such serious consideration that tapering ropes have to be used. In the case of a rope working at a very slow speed, such, for instance, as a capstan rope, a larger factor of safety than one-tenth may be adopted.

Since any extra strain on a rope leaves it weaker than it was before, on no account should a rope used for raising men be ever worked above a fair working load. Experiments made at some of the coal mines prove that, when the full cage is lifted from the bottom, about double the ordinary strain due to the load is produced. This arises from the inertia of the mass to be moved. In winding men, there

should be no resting-place for the cage ; the engine should be started gently, driven regularly, and with a speed of only about two-thirds of what is otherwise usual. The rope also should be examined every twenty-four hours, and this should be done by winding it slowly through the operator's hands ; if he does not happen to see the broken wires, in all probability he will feel them. Occasionally the rope should be thoroughly cleaned, and its condition more minutely ascertained. When broken wires are found, the longest may be tucked underneath and the others cut off to prevent their catching and doing further mischief. The most careful watch must be kept on the portion of the rope where they occur.

A new rope should be tested with several days' winding before men's lives are trusted to it. It is indispensable for the preservation of steel wire ropes that they should be greased regularly. The grease used should be perfectly free from acid, and be soft enough to work into the strands right through to the hemp core. It must not be of such a nature as to harden ; for in that condition, it allows rust to form between it and the wire, so that a rope which appears to be well greased may be corroded to a sensible depth. A mixture of Stockholm or Archangel tar, a vegetable oil, and a little lime boiled together, is often recommended. In this county, the tar is mixed with tallow. These mixtures, however, form too stiff a grease, tend to hide defects, and render the thorough examination of the rope difficult. A mixture containing gas-tar is still more objectionable. Some of the heavy mineral oils, such, for instance, as the Russian, their specific gravity being higher than the American, possess sufficient viscosity to be used as a lubricant for wire ropes, and will, if tried, owing to their freedom from acid and to their power of assisting decomposition, be found to give satisfactory results. At the Wearmouth colliery, they have a patented apparatus, consisting of a pair of wire brushes for cleaning the ropes, and a pair of strong hair brushes, fed with lubricant from feeders above, for oiling them. Both sets of brushes revolve, being actuated by the travelling rope. It is claimed that this arrangement lubricates very thoroughly, and effects a great saving in oil and labor.

When a rope is used for winding men, the shackle should be cut off regularly every two or three months, the rope thoroughly examined, and the shackle reset. This is a point of vital importance for wire ropes. In order to arrive at economical results with wire ropes, accurate accounts should be kept of their working. By this means, the kind most suitable may be ascertained, and a considerable saving effected by using an article best adapted for the purpose. However well a rope may seem to be lasting, it should always be suspected as soon as its duration approaches the average that corresponds with the conditions under which it is working ; it should, at any rate, cease to be used where human life depends on it.

Owing to trade competition, there is great danger of inferior metal being used in the manufacture of ropes, so that, when a new one is required, only the best makers should be applied to, and they should

be furnished with full information as to the conditions under which it has to work. There can be no greater false economy than choosing a cheap rope. When a rope is for the purpose of winding men, it would be advisable to have a sample piece of it (say a length of from 10 to 12 feet) tested before use, in order to see that the quality of the metal and the breaking strain are as represented.

At East Pool, to put on the shackle, the rope is first lashed around with copper wire about 8 inches from the end; the strands are next untwisted, and the wires turned back singly; some are cut off at different lengths, so as to make the requisite taper; while the whole is then bound around with copper wire. The shackle, being heated to redness, is, after the tapering end of the rope has been inserted, hammered down to fit it snug. A coupling is then screwed on, and the shackle brought as tight as possible on the rope. Finally, a steel punch is driven through, to make place for the rivets, which are put in and fastened in the same way as boiler-rivets. The rope end is manipulated at both South Frances and Wheal Sisters in very much the same way as described above, being made of a conical shape like the inside of the socket. It is then pulled back, and a round center-pin of steel driven up in the middle to wedge it. With the socket used at Wheal Sisters, each chain of the runner passes over a separate heater-pin: this is certainly safer. The comparative merits of these attachments have not been ascertained by testing; it is very desirable, however, that this should be done. In many of the coal mines, they use a shackle with hoops and rivets, which is fastened to the rope as follows: The end is untwisted for about six inches; it is then doubled to suit the length of the shackle, the loose end twined around the main rope, and the whole bound with hemp twine soaked in tar; rivets with countersunk heads are put through both ropes and the shackle; the hoops are next put on and driven home tight. This, though doubtless a very strong connection, is not suitable for passing over pulleys and rolls, as our shackles are required to do.

The screw-heater and swivel, with their pins, should be made of from $1\frac{1}{2}$ to $1\frac{5}{8}$ -inch, the runner chains of from $\frac{5}{8}$ to $\frac{3}{4}$ -inch, and the coupling-chains of from $\frac{1}{2}$ to $\frac{5}{8}$ -inch best wrought-iron bar. The pins should be secured in their places by jam-nuts. There should be five coupling-chains—one at each corner of the cage and one attached to the center; the latter carries no weight, but hangs a little slack, and is provided, in case a corner one should break, in order to prevent the cage tipping to one side and jamming itself in the shaft. The links should be made as short as is consistent with easy play, and those at the extremities a little larger and stronger than the rest. Chains require frequent and careful examination, as the links may wear into each other without being detected if not well looked after; also, owing to shocks, jerks, and alternations of temperature they are subjected to when in work, the iron undergoes a change in structure, and gradually becomes hard, crystalline, and liable to snap, as is seen in the case of railroad wagon couplings, which often break short with a crystalline fracture, apparently having had very little wear.

So far as this district is concerned, some of the principal details connected with our winding appliances, and more especially the precautions to be observed in the selection and treatment of wire ropes, have now been briefly touched on. There still confronts us, however, this most important question: In those mines where the men ascend and descend by cages, what means should be adopted in order to avoid the consequences of the breakage of the winding rope?

An attempt has been made to deprive accidents of this nature of their serious character by the application of safety-catches to the cage. About thirty years ago, many different sorts were invented, and for some time were in general use in the collieries, but now you seldom meet with them. It is said that they are liable to come into action when not wanted, especially with quick winding and during the descent of the cage, thus introducing an extra source of danger.

Most of these catches depend on the action of a spring, which comes into play on the breakage of the rope, and forces against the guides either eccentric clutches or levers with sharp points; the weight of the cage then causes the clutches to grip the guides, or, in the case of the levers, the sharp points to penetrate into the wood.

Although there are instances of life having been saved by some of these contrivances, there are also some instances of their failing to act, as in the case of the rope breaking at the Duke Hardenburg colliery (Westphalia), on December 21st, 1882, when 25 men lost their lives. The rope broke just as the cage, fitted with safety-catches, reached the surface; but unfortunately, these did not come into operation.

There appears to be a very general dislike to trust to the action of a spring in such a wet and dirty place as a shaft, and it is also thought that the use of catches would have a tendency to introduce a want of attention to the condition of the rope, and to encourage an attempt to unduly increase its working life.

The following papers relating to the Geology and Mineralogy of Nova Scotia have been read during the past year :

BUDDEN, H. A.—“The Coal of Nova Scotia.” Montreal: Meeting of the British Association.

GILPIN, E., JR.—“Notes on the Manganese Ores of Nova Scotia.” Royal Society of Canada.

“Results of Past Experience in Gold Mining in Nova Scotia.” Montreal: Meeting of the British Association.

“A comparison of the distinctive features of the Nova Scotia Coal Fields.” *Ibid.*

“Notes on the DeBert Coal Field.” N. S. Institute of Natural Science.

“Cape Breton Manganese.” *Ibid.*

HONEYMAN, REV. D.—“Notes of a Microscopic and Polariscopic Examination of Nova Scotian Crystalline Rocks.” *Ibid.*

“Glacial Distribution in Canada.” Geologists' Association.

MURPHY, MARTIN, Prov. Engineer.—“On some Physical Features of Nova Scotia, with Notes on Glacial Action.” N. S. Institute of Natural Science.

SELWYN, A. R. C., Director of Canadian Geological Survey.—“Sketch of Canadian Geology.” Geo. Surv.

I have the honor to remain, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,

Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, McKay, and others .....	.....	1
	COLCHESTER COUNTY.		
	Moir, Wm. C., et al.	Tatamagouche	10½
	CAPE BRETON COUNTY.		
See Lease 105	Burchell, J. E. ....	.....	1
" 106	Burchell, G. L., and others .....	.....	1
" 95	Coxheath Mining Co. ....	.....	1
104	McKenzie, H. R., et al. ....	.....	1
94	McKenzie & McKim. ....	.....	1
	HALIFAX COUNTY.		
1	McClure, Chas. F.	Gay's River	1
	IRON.		
	PICTOU COUNTY.		
44	Hudson, James	East River	1
43	Hudson, James	"	1
Total area under lease			square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.	N. Side East Bay	1
91	Brookman, S. L.	East Bay	1
93	Brookman, S., et al.	East Bay	1
102	C. L. Ingraham	" "	1
103	A. McKenzie, et al.	" "	1
92	Matheson, D., et al.	" "	1
84	Protheroe, Pryse	Cow Bay	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co	Whycocomagh	1
Total area under lease.			27½ square miles.

16	Seaman, Gilbert.....	.....	1	Working.	<i>M. Dunlop</i>	River Herbert
24	Shannon, S. L. ....	.....	2			
36, 39	Shannon, S. L. (in trust) et al	.....	2			
22, 23, 28, 29, 30	Styles Mining Co. (Ltd)....	.....	5		J. S. Hickman..	Amherst.
9	Victoria Coal Mining Co ..	.....	2			
26, 27	Wright, John V.....	.....	3			
			65			
		PICTOU CO.				
1	Acadia Coal Co.....	Fraser.....	1	Working.		Stellarton.
3	" "	Acadia	1	"	{ <i>H. S. Poole</i> ...	Westville.
42	" "	Pictou.....	4	.....	{ <i>J. Maxwell</i> ...	
23	Allan, Sir Hugh, K't.....	Vale	3	Working.	{ <i>J. B. Moore</i> ...	New Glasgow
					{ <i>John Greener</i> .	Vale Colliery.
10	Gray, B. G., et al.....	.....	1			
11	Halliburton, R. G., et al...	.....	1			
	Halifax Co'y, (Ltd).....	Albion	4	Working.	{ <i>S. Cunard & Co</i>	Halifax.
13, 14	Intercolonial Co'y.....	.....	2		{ <i>J. Rutherford</i> .	Stellarton.
12	" "	Drummond	1	Working.	Robert Simpson.	Westville.
6	Kirby, Lewis R.....	.....	1			
15, 30, 31	Merigomish Co'y.....	.....	3			
25	Nova Scotia Co'y	Black Diamond..	4		M. H. Angell ...	Westville.
24	Richey, M. H.....	.....	1			
			27			

LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
3	Archibald, Blowers.....	CAPE BRETON CO.				
2	Archibald, Thomas D.....	Gowrie	1	Working.	{ Archibald & Co... { Chas. Archibald .	North Sydney Cow Bay.
5, 28	Blockhouse Mining Co....	"	1			
29	" (sea area) ..	Blockhouse	2	Working.	R. Belloni	Cow Bay.
72	Brookman, Samuel.....	.....	1			
77	" S., et al.....	.....	1			
76, 15	Caledonia, C. & R. Co....	.....	2			
31	" (sea area) ..	Caledonia.....	1	Working.	David McKeen....	Caledonia M's
30	Campbell, Alex.....	.....	1			
8, 9	Halifax Coal & Iron Co...	Ontario	1½	Working.	T. D. Archibald... John Sutherland ..	North Sydney Pt. Caledonia.
87	Cossit, Geo. G.....	.....	1			
	General Mining Association	Bridgeport.....	2		{ Rich. H. Brown... { Cunard & Morrow	Sydney Mines Halifax.
27	" " " ..	Sydney.....	18	Working.	{ H. Mitchell	Bridgeport.
	" " (sea area) ..	"	4		{ Joseph Simpson . { Donald Lynk	Sydney Mines Low Point.
38, 39	" " " ..	Lingan	13	Working.		
10, 21	" " " ..	"	10			
	Gibson, John, et al.....	.....	2			
4, 12, 16	Glace Bay Mining Co....	Glace Bay	3	Working.	{ E. P. Archibald .. { Chas. Rigby	Halifax. Lt. Glace Bay.
75	Henry, W. A.....	.....	1			
22	Ingraham, J. L.....	Halfway	1			

	International Coal Co. Ltd.	International	4	Working.	P. Johnstone...	Bridgeport.
6, 13, 18, 19	Jennings, Edward.....	.....	1			
71	LeCras & McInnes .....	.....	1			
47	Merchants' Bank of Canada.	Gardener	2			
66	Moore & Moseley .....	.....	1 $\frac{1}{4}$			
74	McDonald, W. B. ....	.....	1			
101	McLeod, Hugh .....	.....	2			
52, 53	Paint, Henry N., and others.	.....	3			
88, 89, 90	Protheroe, Pryse .....	.....	2			
83, 85	Reid, Thos. S. (<i>sea area</i>) ..	.....	2			
73, 82	Ross, H. E., et al. ....	.....	3			
40, 41, 42	Ross, W. J., et al (<i>sea area</i>)	.....	1			
79	South Head Coal Co.	South Head	1			
43	Sword, Wm. (<i>sea area</i>) .....	.....	1			
32	Sydney & Louisburg Coal &	.....	3			
23, 25, 70	R. R. Co., Ltd.	Schooner Pond ..				
14, 24	" " " "	Reserve				
49	" " " "	Lorway				
64, 65, 68	" " " "	Emery				
69	" " " "	.....			
54 to 63	Sydney C. M. Co. (<i>sea areas</i>)	.....	10			
46	Toronto Coal Co.	Collins	1			
67	Weatherbe & Kirby .....	.....	1			
78	Weatherbe, R. L. (<i>sea area</i>)	.....	5			
96, 97, 98, 99, 100	Low. Point, Barasois and	.....			
	Lingan Mining Co. Ltd.	.....	5			
	" "	.....	2		D. Lynk.	Low Point.
		.....	128 $\frac{3}{4}$			

Working. { F. C. Kimber.
W. Routledge.

Working.

10

10

1

1

5

5

2

128 $\frac{3}{4}$

LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		INVERNESS CO.				
5	Aylmer, John Evans Freke.	Cape Mabou.....	2			
8	Evans, Thomas	Chimney Corner.	1			
9	Evans, Thomas (<i>sea area</i>).	.....	1			
7, 12	Inverness C. I. & R. C.....	.....	2			
13	McGregor, J. D	Port Hood	3		Alex. Wright. . .	Moncton.
4	Richey, M. H., et al .....	.....	1			
11	Ross, W. J.	Broad Cove	1			
6	Ross, H. E., et al, (<i>sea area</i>.)	.....	1			
14, 15	Smyth, Peter .....	.....	2			
10	Tremaine, E. D., (<i>sea area</i>.)	.....	1			
17	McDonald, Hugh .....	.....	1			
		RICHMOND CO.	16			
2	Victoria Oil and Mining Co.	Little River.....	1			
		VICTORIA CO.	1			
2	Kenny, T. E.....	New Campbellton	3			
3, 4, 5	Ross, William	Black Rock	5			
			8			
Total area under lease.....			245 $\frac{3}{4}$	square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	58,077	49,549	103,428	80,378	46,557	8,376	.....	.....	208,062	138,303
2nd Quarter.....	74,744	71,643	133,943	109,421	156,640	126,851	.....	.....	365,327	307,915
3rd Quarter.....	73,396	69,619	150,683	156,027	239,574	260,955	.....	.....	463,653	486,601
4th Quarter.....	73,729	67,594	123,139	118,355	155,385	142,882	.....	.....	352,253	328,831
Total.....	279,946	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883.....	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882.....	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179
1881.....	183,419	171,149	372,197	346,968	568,509	516,852	245	45	1,124,270	1,035,014

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.		Grand Total.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia											
Land Sales.....	24,977	29,670	116,187	86,230	2,099	7,312	.....	.....	143,263	123,212	266,475
Sea borne	4,279	576	41,825	18,538	153,210	8,147	.....	.....	199,314	27,261	226,575
Nova Scotia, total	29,256	30,246	158,012	104,768	155,309	15,459	.....	.....	342,577	150,473	493,050
New Brunswick	58,062	35,662	23,286	1,947	39,011	452	.....	.....	120,359	38,061	158,420
Newfoundland .....	.....	.....	2,143	930	82,605	538	.....	.....	84,748	1,468	86,216
P. E. Island .....	.....	.....	7,681	23,662	15,186	3,870	.....	.....	22,867	27,532	50,399
Quebec.....	68,516	35,727	138,283	1,651	143,630	8,975	.....	.....	350,429	46,353	396,782
West Indies.....	9	64	529	84	8,669	240	.....	.....	9,207	388	9,595
United States	156	707	269	818	12,571	49,994	.....	.....	12,996	51,519	64,515
Other Countries .....	.....	.....	106	12	2,229	326	.....	.....	2,335	338	2,673
Total.....	155,999	102,406	330,309	133,872	459,210	79,854	.....	.....	945,518	316,132	1,261,650
1883	152,453	69,894	319,859	141,950	543,419	69,195	687	66	1,016,418	281,105	1,297,523
1882	151,281	67,068	329,350	116,787	522,325	63,245	125	.....	1,003,079	247,100	1,250,179
1881	127,756	49,413	257,573	89,395	446,649	70,203	45	.....	826,003	209,011	1,035,014

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1884.	Year 1883.
N. Scotia.						
Land Sales.	76,166	65,434	45,673	79,202	266,475	259,266
Sea borne..	4,775	53,899	92,115	75,786	226,575	212,061
N. Scotia—Tl	80,941	119,333	137,788	154,988	493,050	471,327
N. Brunswick	26,878	37,036	52,782	41,714	158,420	167,740
Newfl'd	1,170	16,479	41,024	27,543	86,216	61,678
P. E. Island..	.....	11,200	26,661	12,538	50,399	48,088
Quebec	27,007	105,229	190,631	73,915	396,782	410,605
West Indies..	2,128	923	1,554	4,990	9,595	31,860
United States.	179	17,715	35,931	10,690	64,515	102,755
Other Countries ...	.....	.....	230	2,443	2,673	3,470
Total....	138,303	307,915	486,601	328,821	1,261,650	1,297,523
1883..	141,994	325,153	498,913	331,463	1,297,523	1,297,523
1882..	121,898	256,987	494,038	337,256	1,250,179	1,250,179

COAL.—GENERAL STATEMENT.

1884.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	208,062	138,303	32,671
2nd Quarter..... "	365,321	307,915	26,084
3rd Quarter..... "	463,651	486,601	26,284
4th Quarter..... "	352,255	328,831	31,730
Total.....	1,389,295	1,261,650	116,769
1883.....	1,422,553	1,297,523	111,949
1882.....	1,365,811	1,250,179	111,381
1881.....	1,124,270	1,035,114	107,888

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31st, 1884.

COLLIERIES.	SEAMS.	PRODUCE.	SALES.			COLLIERY CONSUMPTION.			
			Paying Royalty.	Free.	Total.	Per cent.	Engines.	Workmen.	Per cent.
CUMBERLAND COUNTY.									
Chignecto	North Seam	11,644	8,358	1,343	9,701	84	1,780	349	18
Joggins	Joggins	25,034	19,795	2,994	22,789	92	1,326	297	6
Maccan .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milner .....	.....	155	48	20	68	44	.....	.....	.....
Minudie .....	.....	10,023	7,722	1,736	9,458	94	460	182	6
Scotia	North Seam and Main ..	609	463	93	556	91	.....	13	.....
Springhill	Black and South	232,481	119,613	96,220	215,833	93	11,127	2,888	6
PICTOU COUNTY.									
Acadia	Acadia Seam	115,451	69,114	38,475	107,589	94	5,893	2,191	7
Albion	Third and McGregor	201,557	120,513	54,688	175,201	86	10,052	4,462	7
Intercolonial	Acadia	120,656	82,360	30,384	112,694	93	6,060	3,182	7
Vale	McBean and Greener ..	73,529	58,322	10,375	68,697	92	9,744	1,140	15
CAPE BRETON COUNTY.									
Barasois	Lingan Main Seam	76	76	.....	76	100	.....	.....	.....
Blockhouse	Blockhouse	23,668	19,583	2	19,585	82	2,658	1,485	17
Bridgeport	Phelan	3,115	3,009	36	3,045	97	38	55	3
Caledonia	Phelan	69,461	49,054	16,386	65,440	94	937	1,094	2
Glace Bay	Harbor	36,138	29,483	3,270	32,753	91	1,600	1,994	9
Gowrie	McAulay	89,384	66,362	15,978	82,340	92	2,321	1,606	4
Ingraham .....	.....	200	90	.....	90	45	.....	30	15
International	Harbor	87,216	69,339	11,459	8,798	93	3,600	1,528	4
Lingan	Lingan	23,404	20,061	810	20,871	81	1,916	1,391	14
Ontario	Phelan	5,890	5,345	370	5,715	97	598	443	17
Reserve	Phelan	96,114	71,088	15,462	86,550	90	3,226	2,794	6
Sydney	Sydney Main	149,378	116,273	15,120	131,393	85	15,610	7,776	15
Victoria	Victoria	14,112	9,447	961	10,408	73	2,223	700	20
		1,389,295	945,518	316,132	1,261,650	.....	81,169	35,600	.....

COLLIERY CONSTRUCTION ACCOUNT.—1884.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Build-ings.	Dwel-ings.	Surface Works.	Railways.	Wharves.	Prospect-ing.	Total.
CUMBERLAND Co.											
Chignecto	\$120 00	617 00	410 00	.....	.....	.....	.....	.....	.....	.....	1147 00
Joggins .....	.....	.....	.....	.....	200 00	.....	.....	.....	.....	.....	200 00
Maccan	150 00	500 00	200 00	600 00	200 00	250 00	250 00	.....	.....	260 00	2410 00
Milner .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minudie .....	.....	.....	125 00	1200 00	500 00	2300 00	.....	.....	200 00	.....	4325 00
Spring Hill .....	.....	6371 00	.....	7329 00	100 00	880 00	1478 00	.....	.....	.....	16158 00
Scotia .....	.....	460 00	184 00	.....	.....	.....	.....	.....	.....	.....	644 00
Pictou Co.											
Acadia .....	.....	.....	.....	5904 00	.....	.....	.....	.....	.....	.....	5904 00
Albion .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Intercolonial .....	.....	.....	.....	10526 00	414 00	.....	.....	.....	.....	.....	10940 00
Vale .....	.....	4600 00	.....	.....	.....	.....	500 00	.....	.....	.....	5100 00
CAPE BRETON Co.											
Barasois .....	.....	655 00	.....	75 00	120 00	.....	94 00	.....	.....	.....	944 00
Block House .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bridgeport	78 00	.....	92 00	160 00	90 00	1880 00	10 00	1800 00	200 00	.....	4310 00
Caledonia .....	.....	.....	842 00	.....	.....	1100 00	.....	1340 00	7117 00	.....	10399 00
Glace Bay .....	.....	.....	154 00	.....	.....	.....	.....	.....	.....	.....	154 00
Ingraham	114 00	.....	.....	.....	50 00	.....	.....	.....	.....	435 00	599 00
Gowrie .....	.....	.....	1970 00	.....	.....	.....	.....	.....	.....	.....	1970 00
International .....	.....	.....	.....	.....	1057 00	.....	.....	.....	.....	.....	1057 00
Lingan .....	.....	.....	837 00	.....	.....	.....	.....	.....	.....	.....	837 00
Ontario .....	.....	.....	23 00	100 00	.....	.....	.....	.....	.....	.....	123 00
Reserve .....	.....	327 00	596 00	2971 00	3123 00	673 00	416 00	142 00	.....	.....	8248 00
Sydney Mines .....	.....	.....	.....	.....	491 00	889 00	.....	.....	.....	.....	1380 00
Victoria .....	.....	5730 00	5832 00	1832 00	260 00	1420 00	870 00	1120 00	3035 00	.....	20119 00
Total	462 00	19260 00	11265 00	30717 00	6605 00	9392 00	3618 00	4402 00	10552 00	695 00	96968 00

MINES REPORT.

Statement of the Number and Classes of Men employed, and average results of each Colliery, during the year ended December 31st, 1884.

COLLIERIES.	UNDERGROUND.				SURFACE.			CONSTRUCTION.		TOTAL.		Average No. of Days per Person.		Average No. of tons per Cutter.	Average tons per day per Cutter.	Average quantity raised per day, tons.	HORSES.		PITS WORKED	
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Mechanics.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Persons.	Under ground.	Surface.				Above.	Below.		
CUMBERLAND Co.																				
Chignecto	23	6	7	7126	5	8	2	4557	...	...	51	11683	197	303	506	5	136	1	2	85
Joggins	50	..	11	11113	13	20	5	9043	3	79	102	20235	182	237	500	2	122	3	2	205
Minudie	22	4	1	5101	5	9	3	4195	3	698	47	9994	188	246	455	1	40	2	...	249
Scotia .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Spring Hill	275	129	86	396801	46	83	15	35424	28	7421	662	439646	809	246	845	2	873	17	13	266
Pictou Co.																				
Acadia	88	81	25	47611	26	39	8	14806	...	26	261	62443	245	220	1211	4	467	5	5	247
Albion	256	139	68	195397	76	126	40	72913	...	...	705	268310	422	301	787	2	730	16	15	276
Intercolonial	135	52	73	61770	35	60	10	27706	6	1698	371	91174	237	263	893	3	492	8	13	245
Vale	148	47	15	46637	40	45	7	31432	...	...	302	78069	222	341	496	1	245	7	5	299
CAPE BRETON Co.																				
Block House	40	5	20	8587	17	26	5	12511	...	...	113	21098	132	260	591	4	164	10	9	144
Bridgeport	7	..	1	1602	1	9	2	1832	12	1728	32	5162	200	152	445	4	34	1	...	90
Caledonia	87	5	23	20183	10	22	8	10255	18	5143	173	35581	175	256	798	5	460	14	7	151
Glace Bay	82	7	14	11510	28	26	3	14040	...	...	160	25550	111	246	443	5	228	3	2	158
Gowrie	91	11	31	29293	17	36	12	16760	...	...	198	46053	220	257	982	5	538	8	15	166
Ingraham	2	..	..	220	1	..	..	210	4	1295	7	1725	110	210	100	2	5	...	...	40
International	349	83	115	38534	73	153	10	24269	14	360	797	63163	70	102	249	2	855	4	28	102
Lingan	48	6	12	14117	2	25	7	8108	...	...	100	22225	213	238	487	3	149	3	4	157
Ontario	15	2	3	2783	6	5	3	2578	...	...	34	5361	139	184	392	...	...	1	2	...
Reserve	128	16	37	32872	19	25	8	13278	29	8118	262	54268	420	255	782	4	513	7	16	187
Sydney	211	34	81	76134	63	97	31	52766	...	...	517	128900	233	276	707	4	913	15	29	164
Victoria	33	23	2	14041	11	28	2	12831	20	6076	119	32948	242	312	427	1	46	3	1	309
	2090	650	625	1021432	488	852	181	369514	127	32642	5013	1423588	238	245	563	2	...	128	168	196

Nova Scotia Coal Sales, from 1785 to 1884 (inclusive).

Year.	Sales.	Total.	Year.	Sales.	Total.	
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177	
1786	2,000		1842	129,708		
1787	10,681		1843	105,161		
1788			1844	108,482		
1789			1845	150,674		
1790			1846	147,506		
1791	2,670		1847	201,650		
1792	2,143		1848	187,643		
1793	1,926		1849	174,592		
1794	4,405		1850	180,084		
1795	5,320	51,048	1851	153,499	1,533,798	
1796	5,249		1852	189,076		
1797	6,039		1853	217,426		
1798	5,948		1854	234,312		
1799	8,947		1855	238,215		
1800	8,401		1856	253,492		
1801	5,775		1857	294,198		
1802	7,769		1858	226,725		
1803	6,601		1859	270,293		
1804	5,976		1860	322,593		
1805	10,130	70,452	1861	326,429	2,399,829	
1806	4,938		1862	395,637		
1807	5,119		1863	429,351		
1808	6,616		1864	576,935		
1809	8,919		1865	635,586		
1810	8,609		1866	558,520		
1811	8,516		1867	471,185		
1812	9,570		1868	453,624		
1813	9,744		1869	511,795		
1814	9,866		1870	568,277		
1815	9,336	91,527	1871	596,418	4,927,339	
1816	8,619		1872	785,914		
1817	9,284		1873	881,106		
1818	7,920		1874	749,127		
1819	8,692		1875	706,795		
1820	9,980		1876	634,207		
1821	11,388		1877	697,065		
1822	7,512		1878	693,511		
1823	27,000		1879	688,628		
1824			1880	954,659		
1825		140,820	1881	1,035,014	7,377,428	
1826			1882	1,250,179		
1827	1883		1,297,523			
1828	1884		1,261,650			
1829	839,981		Total....			22,290,937
1830						
1831						
1832						
1833						
1834						
1835						
1836						
1837						
1838						
1839						
1840						

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 to 1800.....	51,048	1841 to 1850.....	1,533,798
1801 to 1810.....	70,452	1851 to 1860.....	2,399,829
1811 to 1820.....	91,527	1861 to 1870.....	4,927,339
1821 to 1830.....	140,820	1871 to 1880.....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1868	228,132	\$1.25
1851	116,274	"	1869	257,485	"
1852	87,542	"	1870	168,180	"
1853	120,764	"	1871	165,431	"
1854	139,125	Free	1872	154,092	.75
1855	103,222	"	1873	264,760	"
1856	126,152	"	1874	138,335	"
1857	123,335	"	1875	89,746	"
1858	186,743	"	1876	71,634	"
1859	122,720	"	1877	118,216	"
1860	149,289	"	1878	88,495	"
1861	204,457	"	1879	51,641	"
1862	192,612	"	1880	123,423	"
1863	282,775	"	1881	113,728	"
1864	347,594	"	1882	99,302	"
1865	465,194	"	1883	102,755	"
1866	404,252	"	1884	64,515	"
1867	338,492	\$1.25			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1884.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1884.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills Employed.	Steam Power.	Water Power.	Tons of Quartz, &c. Crushed.	Yield per Ton.		Maximum Yield per Ton.		Total Yield of Gold		Average yield per man per day for twelve months at \$18.00 per ounce.
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	
Caribou	3	7499	2	1	1	1559	0	12 9	2	10 0	966	19 22	2.32
Darr's Hill	1	24935	1	....	1	9799	0	6 20	0	9 14	3397	0 0	2.45
Fifteen Mile Stream	1	1573	1	....	1	107	0	16 13	1	5 21	88	14 3	1.00
Montagu	2	4469	2	2	....	539	1	7 8	4	6 0	736	12 23	2.90
Oldham	2	3011	2	1	1	921	0	17 21	2	3 12	824	15 12	4.80
Renfrew	1	3170	1	....	1	1679	0	6 18	1	0 0	569	18 0	3.20
Sherbrooke	8	22142	2	1	1	3268	0	16 7	6	14 12	2668	11 0	2.10
Stormont	1	7337	1	1	....	913	2	8 10	3	17 5	2212	8 1	5.40
Tangier	1	13589	2	2	....	1330	0	14 0	0	18 18	924	2 19	1.10
Uniacke	2	4898	4	3	1	2235	0	10 4	1	4 5	1140	6 2	4.20
Waverly	1	344	2	1	1	10	1	7 0	1	7 0	1	7 0	....
Unproclaimed, &c.	4	25120	7	3	4	2826	0	18 0	5	0 0	2548	19 0	1.80
Total	27	118087	27	15	12	25186	0	12 18	6	14 12	16079	14 10	2.40

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MINES REPORT.

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MONTH.	MONTAGU.						OLDHAM.						RENFREW.								
	No. of Mines.	Days' Labor	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	204	8	...	..	..	..	2	433	17	44	43	7	18	1	...	...	125	35	14	0
February	2	189	7	40	42	7	0	2	303	14	101	112	5	16	1	...	...	120	3	16	0
March	1	332	13	18	9	1	6	2	214	9	53	52	16	0	1	...	...	208	56	12	0
April	1	228	9	71	8	8	0	2	205	8	46	53	0	12	1	...	...	...	..	..	..
May	1	317	12	43	5	9	0	3	269	11	88	63	13	2	1	...	...	280	87	3	0
June	2	369	14	...	..	..	..	3	357	14	97	66	7	6	1	...	...	216	98	14	0
July	2	381	15	46	4	17	17	2	212	8	86	77	8	0	1	...	...	137	58	12	0
August	2	749	30	24	42	8	0	3	185	7	99	76	10	11	2	...	...	...	..	..	..
September	2	1059	42	53	227	18	0	2	195	4	32	11	15	4	2	...	...	...	..	..	..
October	1	260	10	86	115	13	0	2	50	2	20	9	3	7	2	...	...	...	..	..	..
November	1	252	10	88	137	7	0	2	236	10	133	148	8	14	2	...	...	200	77	6	0
December	1	129	5	70	143	4	0	2	352	14	121	109	19	18	2	...	...	393	152	1	0
Totals	1	4469	...	539	736	12	23	2	3011	...	920	824	15	12	1	3170	...	1679	569	18	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	SHERBROOKE.							STORMONT.							TANGIER.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	7	2268	91	500	252	9	0	1	675	27	64	208	3	0	2	1034	41	200	179	6	0
February	7	2050	82	282	193	17	0	1	630	25	65	229	10	0	2	391	16	40	12	2	0
March	8	1976	79	269	380	4	0	1	720	29	71	163	4	0	2	1635	65	223	172	5	18
April	6	1944	78	172	349	15	0	1	680	27	75	181	10	0	2	1093	44	10	6	6	12
May	8	2079	82	206	224	2	0	1	585	23	75	197	7	0	2	862	34	115	108	0	0
June	10	2100	84	195	285	11	0	1	572	23	65	151	10	0	2	1097	44	78	53	17	15
July	9	1890	76	261	238	13	0	1	605	24	97	172	4	0	1	1369	54	....	..	..	..
August	9	1560	62	339	213	3	0	1	560	22	72	149	17	0	1	1290	51	224	138	10	0
September	9	1352	54	329	99	10	0	1	585	23	47	182	10	0	1	1447	60	125	74	0	0
October	10	1728	69	281	100	11	0	1	619	25	113	168	11	20	1	1381	55	147	74	5	0
November	9	1575	63	205	157	15	0	1	598	24	71	185	15	0	1	916	36	124	77	16	5
December	6	1620	65	229	173	1	0	1	508	20	98	222	6	5	1	1074	43	44	27	13	17
Totals	8	22142	....	3268	2668	11	0	1	7337	...	913	2212	8	1	1	13589	...	1330	924	2	1

MONTHLY STATEMENT FROM EACH GOLD DISTRICT—(CONTINUED).

MONTH.	UNLACKE.							WAVERLY.							UNPROCLAIMED.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	3	499	20	222	135	18	10	1	48	..	...	..	..	..	3	1547	62	192	203	18	0
February.....	3	441	20	85	75	7	10	1	34	..	...	..	..	..	3	1561	62	183	191	11	0
March.....	4	626	25	333	131	15	6	1	74	..	...	..	..	..	3	1276	51	233	162	19	0
April.....	2	345	13	175	114	0	5	..	....	..	...	..	..	..	4	2076	83	197	177	12	0
May.....	2	392	16	187	116	2	19	1	12	..	...	..	..	..	4	2486	99	112	91	12	0
June.....	2	320	12	206	53	11	18	1	32	..	...	..	..	..	4	2636	105	208	192	15	0
July.....	2	275	11	148	65	14	15	1	8	..	...	..	..	..	3	2135	85	227	201	19	0
August.....	3	418	16	275	110	11	10	2	71	..	10	1	7	0	3	2095	83	229	252	0	0
September.....	3	482	20	147	128	10	20	2	75	..	...	..	..	..	3	2112	84	273	170	4	0
October.....	3	440	19	142	68	4	18	..	....	..	...	..	..	..	5	2292	91	307	148	5	0
November.....	2	350	14	238	107	2	23	..	....	..	...	..	..	..	5	2444	99	366	388	19	0
December.....	3	310	11	77	33	5	16	..	....	..	...	..	..	..	5	2460	99	299	361	5	0
	2	4898	...	2235	1140	6	2	1	344	..	10	1	7	0	4	25120	....	2826	2548	19	0

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7,275			6,473	1	2	11	156,000	\$ 83	\$249
1863	14,001	14	17	17,002		16	11	273,264	92	276
1864	20,022	18	13	21,434		18	16	252,720	1 42	426
1865	25,454	4	8	24,423	1	0	20	212,966	2 15	645
1866	25,204	13	2	32,161		15	2	211,796	2 14	642
1867	27,314	11	11	31,386		17	9	218,894	2 24	672
1868	20,541	6	10	32,262		12	17	241,462	1 53	459
1869	17,868	0	19	35,147		10	4	210,938	1 52	456
1870	19,866	5	5	30,829		12	21	173,680	2 05	615
1871	19,227	7	4	30,791		12	11	162,992	2 12	636
1872	13,094	17	6	17,093		15	7	112,476	2 09	627
1873	11,852	7	19	17,708		13	9	93,570	2 28	684
1874	9,140	13	9	13,844		13	5	77,246	2 12	636
1875	11,208	14	19	14,810		15	4	91,698	2 20	660
1876	12,038	13	18	15,490		15	13	111,304	1 94	582
1877	16,882	6	1	17,369		19	10	123,565	2 46	738
1878	12,577	1	22	17,990		13	23	110,422	2 05	615
1879	13,801	8	10	15,936		17	8	92,002	2 34	702
1880	13,234	0	4	14,037		18	20	103,826	2 18	654
1881	10,756	13	2	15,556		12	20	126,308	1 52	456
1882	14,107	3	20	22,081		12	18	106,884	2 37	711
1883	15,446	9	23	25,954		10	21	97,733	2 84	862
1884	16,059	18	17	25,147		12	18	118,087	2 40	720
Total.	366,976	11	19	495,923	.....			3,480,193	.....	.....

INTERCOLONIAL RAILWAY.

Statement shewing the quantities, in tons, of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway, during the year 1884.

MONTH.	ACADIA.	ALBION.			CHIGNECTO.	DRUMMOND.	JOGINS.	SPRING HILL.		Vale.
		Round.	Small.	Coke.				Round.	Run of Mine.	
January .....	.....	2004	200	.....	2054	.....	.....	8041	.....	.....
February .....	.....	2382	45	8	2798	.....	.....	8108	.....	.....
March	32	2296	31	.....	837	.....	.....	5557	16	210
April	11	3160	73	.....	.....	93	.....	2751	6427	.....
May .....	.....	1567	98	.....	.....	.....	.....	.....	6530	15
June .....	.....	1354	35	20	.....	.....	.....	91	8207	.....
July	11	1317	112	.....	.....	.....	.....	108	5749	.....
August .....	.....	1048	151	.....	.....	.....	40	54	5484	3296
September .....	.....	594	53	.....	.....	.....	.....	140	1273	5511
October .....	.....	3016	165	.....	.....	.....	.....	79	1978	5338
November .....	.....	4505	21	14	.....	.....	.....	403	4638	7309
December	42	4145	24	.....	.....	.....	.....	5	2711	5929
										6258
	96	27388	1008	42	5689	93	40	25337	43013	33866

INTERCOLONIAL RAILWAY.

STATEMENT, shewing the number of tons of Coal received at the following Stations from Mines in Nova Scotia for the year ending the 31st December, 1884.

STATIONS.	No. TONS.	STATIONS.	No. TONS.
Halifax	57480	Bic	4
Bedford	458	Nappan	50
Windsor Junction	4830	Amherst	3631
Wellington	76	Aulac	240
Enfield	294	Sackville	1871
Elmsdale	158	Dorchester	1057
Milford	41	Memramcook	475
Shubenacadie	330	Painsec	8
Stewiacke	516	Shediac	268
Brookfield	108	Point du Chene	16
Truro	6930	Moncton	14612
Valley	32	Salisbury	1844
Riversdale	6	Petitcodiac	105
West River	24	Penobsquis	1666
Hopewell	1470	Sussex	520
New Glasgow	20729	Apohaqui	6
Pictou Landing	43482	Norton	38
Belmont	35	Passakeag	26
De Bert	6	Hampton	713
East Mines	48	Rothsay	156
Londonderry	77140	Cold Brook	3941
Wentworth	73	St. John	15295
Greenville	40	Berry's Mills	26
Thompson	6	Weldford	48
Oxford	407	Kent Junction	235
River Philip	19	Chatham Junction	205
Athol	4	Derby	28
Maccan	90	Newcastle	110
Bathurst	136	St. Simon	4
Petit Roche	8	River du Loup	117
Jacquet River	10	Ste. Helene	24
New Mills	37	St. Philippe	10
Charlo	16	Ste. Anne	4
Dalhousie	79	St. Roche	44
Campbellton	322	St. Jean, P. Joli	12
Cedar Hall	85	Cape St. Ignace	10
St. Octave	12	St. Charles Junction	35
Ste. Flavie	35	Chaudiere (Local)	39596
Ste. Luce	30	" (Points West)	58040
Rimouski	91	Point Levi	15262
			376049

From the following Stations:

STATIONS.	No. TONS.
Drummond	41373
Hopewell	10548
Stellarton	146888
New Glasgow	26096
Spring Hill	148155
Maccan	2989
Total.....	376049

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

† GYPSUM.

Windsor	Tons.	80,072	Value	\$80,072
Cheverie	"	23,177	"	16,401
Walton	"	4,304	"	3,456
Hantsport	"	350	"	350
St. Ann's, C. B.	"	2,795	"	2,795
Arichat, "	"	370	"	370
	"	<u>111,068</u>		<u>\$103,444</u>

† BUILDING STONE.

Pictou	Tons.	170	Value	\$1,530
Pugwash	"	580	"	
Antigonish	"	30	"	120
	"	<u>720</u>		

† MANGANESE.

Tenny Cape	Tons.	126	Value	
Windsor	"	5½	"	550
Cheverie	"	2	"	180
Walton	"	89¼	"	8,430
East Mountain, Colchester Co	"	30	"	2,700
Loch Lomond, C. B.	"	50	"	
	"	<u>302¾</u>		

GRINDSTONES, ETC.

Lower Cove	} Grindstones	Tons.	2,200	Value	\$26,400
A. Seaman & Co		Scythestones Boxes.	2,000	"	2,000
					<u>\$28,400</u>

LIMESTONE.

†Pugwash	Tons.	301	Value	\$300
†St. Peters	"	4,267	"	
†Londonderry (ankerite)...	"	5,799	"	
†Brookfield	"	15,000 ?	"	
		<hr/>		
		25,567		

ANTIMONY.

†Rawdon Mine.....	Tons.	600
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MOULDING SAND.

†Windsor	Tons.	175	Value	\$265
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COPPER ORE.

Coxheath.....	110 Tons.
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IRON MINING.

Londonderry.....	54,885 tons
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AVERAGE FORCE EMPLOYED DAILY.

Skilled workmen :

Under-ground.....	83	Days Worked.	20,970
Above-ground.....	19		5,774
Unskilled labor :			
Above-ground.....	28		7,236
Under-ground.....	86		19,447
		<hr/>	<hr/>
Total.....	216		53,427

†Amounts exported. The home consumption of Gypsum, Limestone, Moulding Sand, and Building Stone being unknown.

‡Used as flux.

EXPORTS FROM HALIFAX.

Produce of the Mine year ending Dec. 31, 1884.

	Quantity.	Value,
Gold .....	.....	\$307,135
Antimony	Tons. 463	17,865
Oil Coal	Gals. 1,978	372
Salt	Bush. 39,421	8,515
Other Minerals	1,689
		<hr/>
		\$335,574

MINES REPORT.

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FINANCIAL STATEMENT.—GOLD, &c. Mines Department for Twelve Months ended 31st December, 1884.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Total.	Return Rents.	Royalty.	Royalty Commiss'n.	Salaries and Surveys.	Total.
Caribou.....	\$ 24 00	\$ 353 40	\$ 377 40	\$.....	\$.....	\$ 16 45	\$.....	\$ 16 45
Darr's Hill.....	.....	1148 22	1148 22	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	24 00	150 52	174 52	.....	144 38	31	25 50	170 19
Gay's River.....	4 00	.....	4 00	.....	.....	.....	.....	.....
Lawrencetown.....	.....	82	82	.....	.....	.....	.....	.....
Montagu.....	70 00	209 90	279 90	.....	.....	.....	7 50	7 50
Oldham.....	60 00	305 49	365 49	.....	.....	16 58	28 00	44 58
Ovens.....	18 00	.....	18 00	2 00	.....	.....	127 00	129 00
Renfrew.....	20 00	36 52	56 52	.....	.....	1 83	89 00	90 83
Sherbrooke.....	34 00	981 77	1015 77	.....	.....	52 00	399 99	451 99
Stormont.....	112 00	922 93	1034 93	.....	.....	46 14	.....	46 14
Tangier.....	59 00	469 42	528 42	.....	.....	10 40	.....	10 40
Uniacke.....	20 00	766 82	786 82	.....	.....	2 50	130 00	132 50
Waverly.....	270 00	27	270 27	.....	.....	.....	4 00	4 00
Wine Harbor.....	24 00	.....	24 00	.....	.....	.....	.....	.....
Unproclaimed.....	1384 00	1370 09	2754 09	20 00	882 52	17 15	567 87	1487 54
Prospecting Licenses.....	.....	.....	2547 99	.....	.....	.....	.....	210 00*
	\$ 2123 00	\$6716 17	\$11387 16	\$22 00	1026 90	163 36	1378 86	\$ 2801 12

* Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1884.

COUNTIES.	RECEIPTS.				EXPENDITURE.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'n Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	\$ 40 00	\$ 50 00	.....	\$ 90 00	.....	.....	.....
Antigonish	200 00	50 00	.....	250 00	.....	.....	.....
Cape Breton	200 00	125 00	\$52657 74	52982 74	.....	\$1024 15	\$ 1024 15
Colchester	80 00	.....	.....	80 00	.....	.....	.....
Cumberland	360 00	200 00	1013 81	1573 81	.....	730 00	730 00
Digby	40 00	.....	.....	40 00	.....	.....	.....
Guysborough	40 00	.....	.....	40 00	.....	.....	.....
Halifax	40 00	.....	.....	40 00	.....	.....	.....
Hants	80 00	.....	.....	80 00	.....	.....	.....
Inverness	240 00	50 00	.....	290 00	\$ 20 00	.....	20 00
Kings	20 00	.....	.....	20 00	.....	.....	.....
Pictou	420 00	475 00	32605 65	33500 65	20 00	25 00	45 00
Richmond	100 00	100 00	.....	200 00	.....	.....	.....
Victoria	60 00	.....	.....	60 00	20 00	.....	20 00
Yarmouth	20 00	.....	.....	20 00	.....	.....	.....
Examinations .....	.....	.....	.....	24 00	.....	.....	92 63
	1940 00	1050 00	86277 20	89291 20	60 00	1779 15	1931 78

ABSTRACT ACCOUNT.

Receipts and Expenditure for the Twelve Months ended 31st December, 1884.

MINES REPORT.

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RECEIPTS.	EXPENDITURE.
Licenses to Search	Return Licenses to Search
" " Work	Salaries and Surveys.....
Royalty	Examinations
Examinations	
	Return Rents
	" Royalty
	Royalty Commission
	Salaries and Surveys.....
	Return Prospecting Licenses.....
	General Expenses.....
	Postage
	Stationery and Printing

REPORT

OF THE

DEPARTMENT OF MINES,

NOVA SCOTIA,

FOR THE YEAR 1885.



HALIFAX, N. S. :

COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.

1886.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1885.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the mineral resources of the Province, and the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obed't servant,

CHARLES E. CHURCH,

Commissioner of Public Works and Mines.

HALIFAX, February 16th, 1886.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(Member of the North of England and the American Institutes of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,
HALIFAX, February 15th, 1886.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines and Mineral resources of Nova Scotia, and the progress of mining during the year 1885.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1885, compared with that of the previous year:

	1884.	1885.
Gold Ounces.....	16,079	22,203
Iron Ore..... Tons.....	54,885	48,129
Manganese Ore "	302	353½
Copper "	110	
Lead "	100	
Barytes "		300
Antimony "	600	*758
Coal raised.....	1,389,295	1,352,205
Gypsum "	111,068	87,644
Building stone "	780	3,827
Coke made..... "	40,085	30,185
Limestone "	25,567	16,429
Grindstones, etc..... "	2,200	2,208

* Amount exported.

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further information under this head at the end of the report.

I also beg leave to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton. These gentlemen have paid regular visits to the mines in their respective districts, and report that generally every attention is paid to the observance of the Mines Regulation Act. They have prepared for the report a table showing the number of tons of water raised from the mines last year compared with the official returns of the number of tons of coal raised. From these tables it would appear that 3,646,889 tons of water have been pumped, in order to permit the raising of 1,352,205 tons of coal. They have also prepared tables giving the dimensions and duty of the pumps used at the various collieries, and these will, it is expected, be presented in the next annual report.

In September, the American Institute of Mining Engineers held their annual meeting in Halifax. Through the courtesy of the Minister of Railways, free passes were granted to the members over the Intercolonial Railway, and money grants to promote the objects of the session were given by the Dominion and by the Provincial Governments.

At the sessions many papers of interest were read, and excursions made on the harbor and to the New Albion Gold Mines at Montagu, etc. The citizens of Halifax materially promoted the success of the meeting by a reception and an excursion on the harbor.

After the conclusion of the meeting the members separated. One large party visited the Pictou coal mines, and by special trains, boats, etc., were afforded facilities for visiting the coal, iron, copper, and other mineral resources of Cape Breton. Another party visited the Londonderry iron mines, and the Spring Hill coal mines; while those whose time did not allow of any lengthened stay, returned by a special train through the Annapolis valley, visiting the Windsor plaster quarries, etc., on the way.

The visitors were much pleased and greatly impressed with the varied mineral resources of the Province; and the opportunities extended to them of becoming acquainted with our coal, gold and other ores will undoubtedly prove of benefit to us in the future. Their opinion of the Province may be gathered from the following quotation from observations on the meeting published by Dr. Raymond, Secretary of the American Institute of Mining Engineers:—"Nova Scotia has been treated with great partiality by nature, which has heaped upon it with great prodigal hand, the choicest treasures of her mysterious laboratory. Gold, the sorcerer that bewitches the world; coal, the mainspring of civilization; iron ore, manganese, gypsum, and many other useful minerals, are placed in large abundance within easy reach of man, in a fertile country with

wholesome climate. In their proximity to each other and to magnificent harbors, nature has provided all the natural elements of national wealth and prosperity. The artificial elements, capital and energy, only have to be added to secure for this favored land an enviable position among the nations of the earth."

The visit of these Engineers, many of whom are connected with the largest mining and mineral investment undertakings of the United States, will undoubtedly benefit us quite as much as their visit to Montreal a few years ago proved advantageous to that section of the Dominion, the result of which was speedily visible in a large investment of United States capital in the iron ore, phosphate, asbestos, and other mines of Quebec and Ontario.

The wisdom of the Provincial and Dominion Governments in facilitating their opportunities for seeing the country, were commented on by the Engineers, who arrived with an idea that the country was an inferior edition of the State of Maine, and left it impressed with the fact that it contained, in a small compass, unusually large stores of those minerals which nature seldom places in propinquity. The discussion of measures affecting our coal trade relations with the Atlantic ports of the United States cannot fail to be advanced by the experience of those who have personally seen the evidences of our ability to furnish cheap and good fuel to the iron and other manufacturing industries of the Eastern States, which are already dreading the gradual removal of these occupations to the cheap coal of the Western States.

MINERAL RESOURCES OF NOVA SCOTIA.

In the following remarks I have tried to give briefly, and as clearly as I could, an account of the value and extent of the mineral resources of Nova Scotia. I would refer those desiring more detailed information to the Reports of the Department of Mines, to Sir J. W. Dawson's "Acadian Geology," and to papers by the writer in the Transactions of the North of England Institute of Mining Engineers, the Transactions of the Nova Scotia Institute, etc.

It will be observed that we have in our Province coal, iron and gold, and the development of the two last named minerals will form an important page in our future history. Copper, manganese, antimony, barytes, gypsum, marble, etc., also occur in abundance, and have been worked to some extent.

Future researches will probably disclose other valuable minerals, thus the Precambrian rocks of Cape Breton, like their counter parts in Quebec and Ontario, may yield phosphates, plumbago, asbestos, etc., in addition to the iron and copper ores already known to exist in them.

These resources are being gradually developed, and few of the English colonies offer a more promising field to the miner and capitalist. The natural position of Nova Scotia projecting into the North Atlantic with fine harbors, cheap fuel, numerous minerals, its healthy climate and orderly population, and its nearness to England, all combine to forecast an important and prosperous future for it.

MINERALS OF NOVA SCOTIA.

COAL.

THE COAL FIELDS OF NOVA SCOTIA.

Nova Scotia coals belong entirely to the bituminous system of Dana, and may be subdivided into cooking, free burning, and carmel coals. It may be remarked that the coals of this country belong to the same geological horizon of the carboniferous system as those of England and the Eastern United States, and present many points of intimate connection in fossil remains and in the associated strata.

SYDNEY COAL FIELD.

This district occupies the eastern shore of Cape Breton County. Its land area is estimated at 200 square miles, and it now forms the rim of an extensive coal field extending under the Atlantic. Fortunately experience has proved that nearly all the seams can be followed in their subaqueous extension. Estimates based on the system of enquiry adopted by the Royal Commission on the duration of the coal supply of Great Britain, put the amount of available coal in these submarine areas, after making proper deductions for waste, etc., at not less than 2,000,000,000 tons.

The following section, taken in the Lingan district, will serve to show the thickness and relative positions of the best known seams:—

Seam.	Strata and Coal.	
	ft.	in.
Seam A.....	3	..
".....	306	..
Carr	6	5
".....	190	..
Barrasois, or Hub	12	1
".....	379	3
Harbor, Victoria or Sydney	8	..
".....	235	..
Seam D.....	3	..
".....	78	..
North Head.....	4	..
".....	75	..
McAuley, Phelan, or Lingan	8	..
".....	95	..
Ross, or Emery.....	4	6
".....	340	..
Gardener	4	9

The coal field is remarkably free from disturbances, etc., and Professor Lesley, in a report, dwells strongly on this point.

Nearly all the seams lie at easy angles, yield little water, and owing to the generally firm character of the roof, they can be mined with unusual cheapness and safety. So strongly marked is the

impermeable nature of the strata, that at a moderate depth the submarine workings are perfectly dry.

There are seams found underlying those given in the above section, and varying in thickness from two to eight feet, but in the presence of the seams cropping on the shore they have not hitherto attracted much attention.

The coals of this district are bituminous, and specially adapted for gas and coke making, and for steam purposes. The Sydney Mines coal is largely used in the Lower Provinces for domestic purposes. The gas values may be understood from the following test made of the Harbor seam coal:—

Gas, cubic feet per ton.....	10,000
Candle power	16
Coke, good, lbs.....	1,470

Official reports on this seam made to the Admiralty show that it contains 83.5 per centum of carbon, and that it is practically equal to Welsh steam coal. Trials made on H. M. S. *Gannet* show that when mixed with twice its weight of the best Welsh coal, a saving of 12 per cent over the Welsh coal alone was obtained. Practical tests made some years ago for the United States Naval Department, showed a practical evaporative power of 7.9 lbs. for the Sydney seam. Similar tests and trials of the other seams show equally good results, and Sydney Harbor has become a well-known port of call for steamers requiring bunker coal. Newfoundland sealing steamers prefer Cape Breton coal to all other owing to the rapidity with which it raises steam.

These coals have been largely used on Canadian railways, and are found to compare most favourably with the best imported coals, and in many cases are given the preference. As yet the slack coal has not been burned into coke except in small amounts for the local foundries, but considerable quantities are shipped to the United States, where an economical fuel is made by mixing it with the dust of anthracite coal for use under ordinary steam boilers. The contemplated establishment of large iron and copper works on Sydney Harbor will afford a near market for both slack and coke.

The following analyses will serve to show the general character of the seams of the district : *

Composition.	Name of Seam.		
	Sydney.	Phalen.	Harbor.
Moisture	1.260	.921	.80
Vol: Comb: Matt: Fast Coking.....	35.514	30.312	29.40
Fixed Carbon "	59.111	62.334	65.50
Vol: Comb: Matt: Slow Coking	33.840	28.625	27.85
Fixed Carbon "	60.785	64.021	67.05
Ash	4.115	6.433	4.30
Sulphur	1.705	1.105	1.29
Theo: Evaporative power	8.33	8.78	9.19

* The analyses of coals in this report are by the writer, and for full information on the compositions and values of Nova Scotian coals the reader may refer to a paper on Canadian coals by the writer in the Transactions of the North of England Institute of Mining Engineers, 1878.

The statistical tables of this report will show the production of coal and the various classes of labor employed in the collieries of Cape Breton County. It may be remarked that the collieries are well equipped, and worked in a systematic manner; and that, standing between the English and American coal fields, the operators have adopted from both the appliances and methods a varied experience has shown to be best adapted to the needs of Nova Scotian coal mining.

The enormous amount of available coal contained in this district^t may be estimated from the Geological Survey Report, which states that the seams now opened contain, in the areas leased for the purpose of working them, over 212,000,000 tons. This estimate does not include the coal in the seams which are unopened in the land areas in operation, nor the values of the seams in the leases which are at present awaiting a favorable opportunity for development, which items would swell the coal supply of this district to figures representing many years output greatly exceeding any yet obtained.

In addition to the seams already recognized in the Sydney coal field as at present worked, there are, in the vicinity of Sydney, and in the Mira and Salmon River districts, extensive tracts of the upper part of the millstone grit in which are met coal seams, some of superior quality, which although too small to be worked now in the presence of the large beds, must yield in the future an important supply of fuel.

OTHER CAPE BRETON COAL FIELDS.

On the River Inhabitants and at Port Hood, Chimney Corner, and Broad Cove, on the western shore of the Island, are small coal districts containing in all about 125 square miles, exclusive of the submarine extension of the seams found in them. At several points in these districts beds of coal of large size and of excellent quality have been opened, but as yet systematic coal mining operations in Cape Breton island have been confined to the Sydney district. It is claimed that many of these seams of coal are of very superior steam raising qualities, and it is anticipated that as the coal trade extends, the St. Lawrence markets will be largely supplied from this source.

Passing to Nova Scotia proper, coal seams are found at Pomquet and Antigonish, but the extent of productive ground is inconsiderable. Near New Glasgow, in Pictou County, there is a coal district, not of large extent, but noted for the great size of its coal beds, and for their excellent quality.

In 5,567 feet of strata, according to the surveys of the late Sir William Logan, there are 141 feet of coal contained in 16 beds, varying in thickness from 3 to 34 feet.

The coal is slightly less bituminous than that found in the Sydney district, and is especially adapted for steam raising. Several of the coals make an excellent coke which has been successfully used with raw coal in the blast furnaces of Londonderry in Colchester County. The coal of the Acadia seam is also in demand for domestic purposes.

The following analyses of the Albion main seam, thirty-four feet thick, and of other seams now worked, will show the quality of the coals:—

COMPOSITION.	Albion Main Seam.	Acadia Colliery.	Six Feet Vale Colliery.	Intercolonial Colliery.
Moisture.....	1.05	2.10	1.22	1.52
Vol: Comb: Matt: Fast Coking	27.42	32.78	25.87	31.87
Fixed Carbon "	62.18	57.57	62.70	57.78
Vol: Comb: Matt: Slow Coking	26.19	29.20	22.96	29.46
Fixed Carbon " ..	63.41	61.15	65.61	60.19
Ash	9.35	7.55	10.21	9.10
Sulphur	1.48	.50	trace.	1.62
Theo: Evaporative power	8.68	....	8.99	8.24

There are at several points in this district beds of oil shale, which may before long be found worth utilizing. Several beds of cannel coal have been found, one of which was for sometime worked on the property of the Acadia Coal Company, and yielded 126 gallons of crude oil to the ton.

There are four large and well-equipped collieries in this district. Their output is taken by the Londonderry Iron Works, local manufacturing, and railways, and considerable shipments are made by rail and from Pictou Harbor to Quebec and Montreal.

The coal measures are interrupted at New Glasgow by lower strata, but in the opinion of Sir J. William Dawson, and other geologists, the coal measures extend many miles to the north and north-west under the covering of the upper division of the carboniferous system. Possibly at some points this covering may be thin enough to permit of the coal being reached.

Small seams of coal are known all along the shores of the Bay of Fundy, but have not yet been worked.

The Springhill coal field lies north of the Cobequid Mountains, in Cumberland County, at the western extremity of the problematical coal field referred to in connection with the Pictou district. The northern edge of this coal field has been traced from the Joggins shore of Cumberland Basin, about 18 miles, to the Styles mine, but its deflexion to the south to join the Springhill coal mines district has not been followed. On the Southern or Springhill side of the basin there is a large and important development of coal seams. The productive measures stretch for many miles in a westerly direction to the Cumberland Basin at Apple River, but have not yet been prospected. Several mines have been worked on the northern out-crop at the Joggins, Maccan, &c., but the chief development has

been at Springhill by the Cumberland Railway and Coal Company, who have proved and extensively worked the following set of beds:—

	Ft.	In.	Ft.	In.
North Seam—Coal	13	..	..	..
Strata .....	..	..	105	..
Coal	5	..	..	..
Strata .....	..	..	130	..
Coal	2	4	..	..
Strata .....	..	..	185	..
Main Seam.....	11	..	..	..
Strata .....	..	..	80	..
South Seam.....	11	..	..	..
Strata .....	..	..	100	..
Seam	8	6	..	..
Strata .....	..	..	190	..
Seam	4	..	..	..
Strata .....	..	..	176	..
Seam	2	9	..	..
	57 7			

Their out-put is now at the rate of 350,000 tons per annum, and is largely used for steam purposes on Canadian railways, steam-boats, &c. The coal is also adapted for domestic purposes, and its coke is extensively used at the Londonderry Iron works.

The following analyses made by me some time ago will show the quality of the coal of this district:

CONTENTS.	North Seam.	Main Seam.	South Seam.
Moisture	1·625	·78	1·39
Vol. Combustible matter.....	28·672	31·32	31·22
Fixed Carbon.....	65·431	62·54	61·58
Ash	4·272	5·34	5·79
Sulphur	·783	1·38	·80
Evaporative power.....	8·99	....	8·46

The extent of country underlaid by the productive measures, is not yet clearly known, but has been estimated at 300 square miles. The district is intersected by the Intercolonial Railway; and a branch railway runs from the Springhill collieries to Parrsboro, on the Bay of Fundy, where extensive shipping docks are being constructed.

The history of Nova Scotian Coal Mining is a short one. Early writers of Colonial history refer frequently to the Cape Breton coals, which, outcropping on the beaches and in the sea cliffs, formed a prominent feature in the landscape, and were mined by the French and English garrisons of Acadia, and by a few American smugglers. This state of affairs continued until the early part of the present century, when, after a few attempts at systematic mining, the minerals of the

Province were granted to the Duke of York, who transferred them to the London jewellers, Messrs. Rundle & Bridge, who sold them to the General Mining Association of London in 1827. This company commenced extensive operations at Sydney, Pictou, and the Joggins in Cumberland Co., and continued them until 1857. At that time arrangements were made with the Government whereby the General Mining Association surrendered their claims, except to certain large tracts in the various coal districts, and the public were allowed to open mines under leases from the Government. This arrangement led to the opening out of quite a number of collieries, and the sales increased from 226,725 tons in 1858 to 395,637 tons in 1862. Nova Scotian coal was at this time admitted into the United States free of duty, and the sales to this quarter were about 450,000 tons in 1865 and 1866 out of a total of about 595,000 tons sold. In 1867 the U. S. imposed a duty of \$1.25 a ton which in 1872 was lowered to 75 cents a ton. But the sales to the United States continued to diminish, until in 1885 they were only 34,483 tons. In the meantime, the consumption in Nova Scotia and the adjoining Provinces had been steadily increasing, until in 1885 the sales of Nova Scotia coal were as follows:—

Provinces of Nova Scotia.....	444,652
New Brunswick.....	148,634
Newfoundland	74,322
Prince Edward Island.....	52,770
Quebec.....	493,917
West Indies	5,732
United States	34,483
<hr/>	
Total (long tons).....	1,254,510

PETROLEUM.

Indications of this valuable mineral have been observed at Cheverie, Hants Co., in Pictou Co., and at Lake Ainslie in Cape Breton, but the result of explorations made in the latter locality have not proved satisfactory.

THE GOLD FIELDS OF NOVA SCOTIA.

The auriferous district of Nova Scotia stretches in an irregular band along its southern shore. Its area is estimated at about 3,000 square miles. The gold mines are scattered irregularly through this band, the greater number being to the eastward of Halifax. The auriferous districts are found to contain numerous veins of quartz from one inch to six feet in thickness, running continuously in many cases for several miles. Nearly all these veins contain gold, but, as elsewhere, only a certain percentage are rich enough to work. They carry the gold in visible grains imbedded in the quartz, and in the various sulphides of copper, lead, iron, etc., invariably found in them. The width of the veins usually worked varies from four to twenty inches, but in some cases they are found to be highly auriferous when much wider.

These veins carry gold in amounts varying from a trace up to several ounces, and in common with auriferous veins of other countries, frequently present it in the form of "pay streaks" or rich zones in the vein. These pay streaks are of varied width and depth, and are frequently very rich. In the Sherbrooke district one of these rich deposits was followed to a depth of 600 feet. The quartz surrounding these richer portions of the veins varies in value from three to ten dollars a ton. Other veins again show a uniform yield, not exceeding one-half to three quarters of an ounce to the ton for long distances.

Among the more prominent districts at the present time may be mentioned the Salmon River Mines. Here work has been carried on for several years on a vein of quartz from three to six feet wide. Several shafts have been sunk to a depth of about 150 feet, and ore has been extracted from a portion of the vein about 900 feet long. The quartz is crushed in a stamp mill driven by water power, and placed about a quarter of a mile from the mine. There are eight batteries, each holding five stamps, weighing about 700 lbs. each complete. The average yield from the quartz has varied between 7 cwts. and one ounce to the ton. Owing to the size of the vein and the cheapness of the water power crushing, this ore could be profitably treated even if the value of the gold yield fell to five dollars, or say twenty shillings to the ton. Since the opening of the mine 33,253 tons of quartz have been crushed and yielded 18,047 oz. of gold. This mine can be taken as a sample of others now working in the Province, but it will be understood that the narrower the vein the richer its contents must prove, as the expense of mining increases rapidly with the greater amount of dead work. At Montagu, Rawdon, Oldham, Stormont, and Lake Catcha profitable mining has been carried on during the past year.

However tempting the prospects of the rich quartz veins may prove to the miner, the great future of gold mining in Nova Scotia, in my opinion, lies in the so-called "low grade" ores. In many of the districts are met wide belts of slate and quartzite, intersected by quartz veins, both the veins and the rocks being more or less auriferous. Experience in the Western States has shown that ore such as this, mined in large quantities and crushed and amalgamated in large mills of 75 to 100 stamps, pays well even when worth not more than \$5 a ton. Trials on a working scale have been made of such ores as they occur in this Province, and the field appears even more promising here than in any other gold mining country.

At Sherbrooke and Mount Uniacke large lots of this ore have been quarried and crushed in small mills, and the results have shown that such operations, if conducted on a large scale, with approved appliances, would pay well. The values of these crushings have averaged from 3 to 7 dwts. to the ton, and it can be safely asserted that nowhere can labor and the usual supplies of mining camps be procured more cheaply than in Nova Scotia.

ALLUVIAL GOLD.

In Nova Scotia, contrary to the history of most gold mining countries, alluvial work has played an insignificant part. It is generally believed that the causes, which have contributed to the present contour of the country, have swept all detritus away into the Atlantic. This is a mistake. Australian miners assert that bare rock surfaces are not more abundant in the district under consideration than in the gold districts of Australia. Small amounts of gold have been procured by alluvial work at Tangier, Waverley and Moose River, but no systematic attempts have been made to test the old river courses, or the still waters, etc., of the present drainage systems which run for the most part transversely to the strike of the veins. Many of the districts have a surface apparently rich enough to treat by sluicing and crushing, and several of the rivers are reported to give good tests.

At Gay's River, an ancient indurated sea beach or river bed lying on the auriferous measures, carries gold at the junction of the slates and conglomerate, and has been worked to some extent.

MINING.

The veins dip at all angles and are invariably opened by shafts sunk on the dip of the vein. This is not perhaps quite according to mining text-books, but experience shows that it is best adapted to the veins and to the encasing strata of this country. The stopes are carried from shaft to shaft, a distance of from 80 to 200 feet, by underhand work, powder or dynamite being used. The firmness of the rocks makes the mines usually very dry, and the expense of pumping is small whenever the surface is properly drained. The cost of mining, there being little dead work, varies according to the size of the vein and the hardness of the encasing rock, from 50 cents a ton in the open cast work to \$15 a ton in the narrow and tight bound veins. The quartz is crushed in stamp mills similar in general construction to those used in other parts of the world. The stamps weigh from 450 to 750 lbs. and fall at the rate of from 30 to 50 drops a minute. Mercury is fed into the mortar in which the stamps work, at frequent intervals, and the coarse gold is amalgamated and retained around the dies in the bottom of the mortar. The mills in common use in the Province crush to a fine powder about a ton of quartz to each stamp, in a days' work; when quartzite and slate are being treated more rapid progress is made. The pulverised ore is carried by water through fine screens and over copper plates amalgamated with mercury for the purpose of arresting the fine gold.

As already mentioned, the veins always carry sulphides, etc., of various metals, which include considerable amounts of gold. This gold is but partially arrested in the mill or on the plates, and usually passes into the refuse tailings. Assays show that these tailings when concentrated, are often rich enough to warrant attempts being made to save the gold, but hitherto no systematic attempts have been made in this direction.

All the auriferous ground in the Province is the property of the Government, and it issues leases for three terms of twenty years. The areas are laid off in rectangular form, each area being 150 by 250 feet, with the shorter sides parallel to the general run of the veins and the beds of the district. The fee paid for each area is two dollars. Similar areas can be taken under prospecting licenses for the space of six months, on payment of a small registration fee. Provision is made whereby the holder of any lease can require by arbitration or by grant from the Government, the ground needed for mining purposes. In return the lessee is required, under risk of forfeiture, to employ forty days labor on each of his leased areas, and to make periodic returns of this labor, and of all quartz sent to a mill.

Any person desiring to build a quartz crusher must procure a license therefor, and give bonds for the due discharge of his obligations, which are to keep an account of all quartz crushed, and to pay to the Government the royalty on all gold extracted. This royalty is at the rate of two per cent. on unsmelted gold valued at \$18 an ounce, and at the same rate on smelted gold valued at \$19 an ounce. By this arrangement the miner having delivered his quartz to the mill owner is free from any responsibility about the royalty, as the Government looks to the licensed mill owner for it.

The statistical tables at the end of the report show the yield of each district during the past year, and a summary of the returns since the compilation of statistics was commenced.

IRON ORES.

This, perhaps the most important of our mineral resources, has not as yet received attention at all commensurate with its value. The ores are of the most varied species and frequently very pure. They are generally accessible, near water or railway transport, and none of them at any great distance from coal. Beginning at the western end of the Province, titaniferous iron sand is met at St. Mary's Bay, and the trap rocks forming the south side of the Bay of Fundy yield abundant indications of specular and magnetite. At Clementsport and Nictaux are beds of red hematite and magnetite, formerly worked to a small extent in charcoal furnaces. From this point as far west as Windsor, specular, red hematite and bog ores are found, but little is known of their extent or value. Similar ores, sometimes highly manganiferous, are met between Windsor and Truro, at Goshen, Maitland, Brookfield, etc. The following analysis of limonite from the last named place is of a very pure ore:—

Water.....	11.36
Silicious matter.....	1.54
Phosphoric acid.....	trace.
Sulphuric acid.....	none.
Magnesia.....	trace.
Metallic iron.....	60.00

On the north side of the Bay of Fundy the limonite ores of Londonderry are well known. Their passage has been traced for fifty miles along the range of the Cobequid Hills, and they have been worked for many years at the Acadian Mines. Large amounts of a variety of spathic ore are mined and smelted with the limonite, and a good grade of pig made, part of which is converted into bar iron, etc. There are two large blast furnaces, with rolling mills, foundries, etc., and from 40,000 to 60,000 tons of ore are annually smelted. The following analysis will show the character of the iron ores, and of the iron made at this establishment:—

	Micaceous Hematite.	Limonite.
Per oxide of iron.....	96.93	82.65
Oxide of manganese.....		.25
Alumina .....	.33	.56
Lime ....	.04	.15
Magnesia.....	.11	.10
Phosphoric acid.....	.07	.38
Sulphuric acid .....	.03	.02
Water hygroscopic.....	.03	.31
Water combined.....	.79	10.51
Insoluble.....	1.26	4.79
Metallic iron	67.85	57.85

Spathose Ore (Sideroplesite.)

Insoluble silicious matter.....	.47
Calcic carbonate.....	.59
Ferrous "	69.20
Manganous "	1.37
Magnesian "	28.73
Ferric oxide.....	.08

Analysis and tests by Riehle Bros.

Bar iron ductile and fine grained. Tensile strength. 60,000 lbs. per square inch, and elongation 33 per cent.

	No. 1 Pig.	Sieman's best Bar Iron.
Silicon.....	3.621	.280
Graphitic carbon	3.730	....
Combined carbon ....	.390	.096
Sulphur .....	.002	trace.
Phosphorus.....	.198	.035
Manganese	1.126	.041
Iron.....	90.933	99.548

Iron ores are known at Pugwash, Wallace, Joggins, Clark's Point, etc., north of the Cobequid Hills.

The Londonderry iron ore bearing ground passes north of Truro and extends into Pictou county, and may be said to terminate at Cape George in Antigonish county. On entering Pictou county near the line of the Intercolonial Railway, are met widespread indications

of specular ore, which at several points show veins of workable size. This specular ore ground extends to the head of the East River, a distance of about twenty miles, and carries ore veins, which, as proved on the Watson and Weaver properties, attain a thickness of fifteen feet. South of this band are deposits of limonite ores, which, however, are yet little known. In the vicinity of Springville, between the specular ore and the Pictou coal field, are large and valuable beds of limonite, sometimes highly manganiferous, and bedded red hematites attaining a thickness at some points of from 20 to 40 feet. Among the more prominent localities holding these ores may be mentioned Springville, Bridgeville Blanchard, Little Blanchard, Webster's Mountain and Fall Brook. On Sutherland's River these ores approach the eastern end of the coal field, and the Watson ore bed at Fall Brook is about two miles from the Vale colliery, and is about fifteen feet in width. Still further east near the line of the New Glasgow and Cape Breton Railway are deposits of spathic iron ore and of clay ironstone. These ores extend for many miles, until the measures carrying them are cut off by the Gulf of St. Lawrence. An exposure of a bed of red hematite three feet thick at Arisaig marks the termination of this district, which is fifty miles long, and attains a maximum width of about six miles. Clay ironstone is met at several points in the Pictou coal field and between New Glasgow and Pictou.

The following analyses will show the character of the Pictou iron ores:—

	Limonite.	Clay Ironstone	Specular.	Red Hematite.
Water	7.702	2.132	.....	.....
Iron Peroxide.....	87.925	45.361	97.52	65.26
Alumina	trace.	16.962	.....	5.59
Silica	3.000	.780	3.20	25.68
Manganese Binoxide.....	trace.	.....	.....	.....
Lime	do.	trace.	.91	1.88
Magnesia .....	.500	1.655	.....	1.05
Sulphur	trace.	.612	.06	.....
Phosphorus	do.	trace.	trace.	.....
Metallic iron	65.54	35.00	68.33	43.4
Carbonic acid .....	.....	.....	.....	.....

The following analyses is of the spathic ore from Sutherland's River:—

Sesquioxide of iron.....	20.52
Carbonate of iron	57.40
Carbonate of manganese	8.29
Carbonate of lime.....	4.02
Carbonate of magnesia.....	5.66
Silica	2.38
Moisture	1.43
Sulphur	none.
Phosphorus	none.
Iron	42.07

It may be remarked that in Pictou county the conditions for making iron and steel cheaply are unsurpassed, as within a few miles are collected numerous iron ores, fluxes, and good furnace fuels, and there is railway and water communication with all parts of the Dominion.

In Cape Breton indications of valuable iron ores are frequently met, but hitherto there has been little inducement to test or develop them. Near East Bay a bed of red hematite ore from 4 to 13 feet wide has been traced several miles. The following analysis of it is from the records of the Geological Survey of Canada:—

Iron Peroxide	85.057
Silica	5.130
Sulphur .....	.075
Phosphoric acid.....	.032
Metallic iron.....	57.526

At Whycogomagh, on the Bras d'Or Lake, several beds of red hematite and magnetic iron ore have been followed for some distance, by trenches and natural exposures. Both these deposits are close to good shipping places.

Louisburg, Gabarus, Big Pond, Lake Ainslie, and St. Peter's, among other localities, may be mentioned as likely to contain valuable ores.

The conditions upon which iron ore lands are leased by the Government are similar to those regulating the coal properties, and will be referred to further on.

There are numerous localities yielding iron ores beside those I have briefly touched upon. Among these may be mentioned Salmon River Lakes, Boyleston, and Manchester, in Guysboro' county, where valuable deposits of specular ore have been superficially tested. At Stewiacke, Riversdale and Musquodoboit are ores of red hematite and limonite, while at numerous points over the Province are deposits of bog iron ore, often of good quality, and a valuable accessory to local smelting operations.

COPPER ORES.

Indications of copper ore are widespread throughout the Province, and although promising at several points, explorations have, in a few instances only, been pushed far enough to show workable deposits. The trap of Annapolis and Kings counties shows native copper, with carbonates, etc. Among the more promising localities may be mentioned Margaretsville, Digby, and St. Mary's Bay, Cape d'Or, etc. The carboniferous measures of Pictou, Cumberland, and Antigonish counties frequently show deposits of the vitreous sulphide and of carbonate of copper, and some of them may prove valuable. At several points in this district small lots of rich ores have been exported, but no attempts have been made at systematic work.

In the vicinity of College Lake, in Antigonish county, several valuable deposits of copper pyrites have been thoroughly tested. It is believed that large amounts of ore running from three to eight per cent. can be obtained here, but the depression in the copper trade has prevented development. In Cape Breton the precambrian felsites frequently show copper pyrites. These have been prospected with promising results at Gabarus and French Road, and at Coxheath near Sydney. At the last named locality a large amount of work has been done, showing the presence of immense masses of ore carrying from 3 to 8 per cent. of copper. Preparations are now being made to smelt these ores into a matte, a business for which the locality affords every facility in the way of fuel, fluxes, shipping ports, etc. Other localities are Cape North, Cheticamp, East Bay, Benacadie, etc.

LEAD ORE.

In this Province the only source of galena appears to be the carboniferous marine limestone series. At Gay's River, Shubenacadie, and Stewiacke it is frequently met in these rocks. At Smithfield, Upper Stewiacke, the limestones carry at several points large masses of galena, with copper and iron pyrites and calcite, and small amounts of silver are reported to be present in the galena. Preparations are being made to erect experimental smelting works at this point, as it is believed that an abundant supply of ore can be secured.

ANTIMONY.

This ore is known at several localities in the Province, but has hitherto been worked only at Rawdon, Hants county. Here a vein from 6 to 20 inches in width has been successfully worked during the past two years, and has yielded a very pure ore, all of which has been exported to England. The exports during the year 1884 were 463 tons, valued at \$17,865, and during the year 1885, 758 tons, valued at \$33,095. At present only the higher grade ore is shipped from this mine, and the accumulations of low grade ore await treatment. At the New Brunswick antimony mines this was largely smelted at a central furnace, and no doubt a similar plan could be advantageously adopted here.

MOLYBDENUM.

This mineral occurs at Gabarus in Cape Breton, and at Hammond's Plains and Musquodoboit in Halifax county. Small lots have been shipped from the first named locality, but no demand has yet risen to warrant attempts at its regular extraction.

NICKEL AND COBALT.

These elements occur in small quantities in the associated minerals of our auriferous veins, etc., and some of the iron sulphides occurring in the upper horizons of the lower cambrian hold them in notable amounts. Hitherto no attempt has been made to ascertain if they can be turned to any account.

MANGANESE.

There are numerous localities in the Province which have yielded rich deposits of these ores. At Tenny Cape, Hants Co., Onslow, Colchester Co., and Salmon River, Cape Breton Co., small shipments are annually made of very rich ore, containing from 89 to 98 per cent. of binocide, with mere traces of iron. The exports are principally to glass makers in the United States, and the ore brings from \$75 to \$100 a ton at the mines. Few shipments are made of the low grade ores, which are abundant, and a large trade could be done if a start were once made. Among other localities may be mentioned Pictou, Bridgeville, and Glengarry, Pictou Co., and Amherst, Cumberland Co.

Beds of wad, or bog manganese, are found at numerous points, but hitherto it has not proved profitable to export them.

GYPSUM.

This mineral occurs in the Province as soft or hydrated, and as hard or anhydrous gypsum. It is exposed in beds, varying in thickness from a few inches up to 200 feet, and is also found in fine grains and veins in the shales, marls, and limestones which are usually associated with it. In the Maritime Provinces it occurs in the carboniferous marine limestone formation, already referred to in connection with the manganese ores, and wherever the limestones appear it is usually at no great distance. It is so widely scattered through the northern and eastern parts of Nova Scotia that a detailed list of its exposures could not be given. It has been mined chiefly at Windsor, Cheverie, Walton, Maitland and Hantsport on the Bay of Fundy, and at Port Hood, Port Hawkesbury, Lennox Passage, Baddeck, and St. Ann's, in Cape Breton. Among the minerals found in the gypsum may be mentioned glauber salt, common salt, magnesium carbonate, sulphur, and several varieties of borates, similar to the Peruvian Ulexite and "Tiza." Should these borates be found in any amount in our gypsum beds they would undoubtedly prove of great value.

The Nova Scotian deposits of gypsum are on an unequalled scale, the beds being frequently traceable for miles by exposures presenting faces 50 feet in height. In Antigonish Co. it occurs on St. George's Bay as a crystalline cliff, 200 feet high, and similar exposures are met at

Plaster Cove, Mabou, and many other localities in Cape Breton. This scale of exposure, and frequent proximity to good shipping places, has materially aided the out-put of the mineral, and it can at many points be placed on board for 50 or 60 cents a ton.

The anhydrite is found imbedded in the soft gypsum, but is seldom exported. The exports of gypsum are almost entirely to the United States, where it is ground as a fertilizer, or boiled and ground for finishing houses, cornices, etc., according to its purity and color.

It is said to be a suitable dressing for tobacco and cotton lands, and large quantities are mined for this purpose in Virginia. The gypsum is used to a very limited extent in Nova Scotia for agricultural purposes; in fact in our best farming districts nature has disseminated this useful fertilizer very freely. A large mill in New Brunswick supplies the local market with the prepared article as required for architectural purposes. The annual exports, chiefly from Windsor and its vicinity, on the Bay of Fundy, vary from 80,000 to 140,000 tons, valued at about 95 cents a ton.

MINERAL PAINTS.

As might be anticipated in a country yielding iron and manganese ores, the different varieties of ochres and umbers are frequently met. Among the various localities yielding these mineral paints may be mentioned Londonderry, Onslow, Stewiacke, Maitland, Chester and Kentville. Small amounts are dried and ground for local use, but the trade is almost exclusively supplied from foreign sources.

BARYTES.

This mineral occurs at Five Islands, Bay of Fundy; River John, Pictou County, and at Stewiacke, Colchester County. At the latter place about 300 tons were mined last year, and was worked up at Halifax in the manufacture of paints, etc.

MINERAL WATERS.

At numerous localities through the Province mineral springs have been known for many years, and are used for various complaints. Few of these waters have been analysed, but they are worthy of careful examination, as the presence of mineral waters of undoubted excellence has frequently done much to attract visitors, and produce benefits important if not conspicuous.

In the gypsiferous districts brine springs are frequently met. Some of the springs in the early days of the settlements were utilised by those living in the vicinity, and considerable amounts of salt manufactured for home use. Now the imported salt has so lowered prices

that salt-making has ceased to be a provincial industry. The presence, however, of these brine springs is of importance in relation to the possibility of beds of salt being connected with the gypsum beds. Should examination prove this to be the case, a large and valuable industry would be revived. The same speculative interest attaches to the instances of sulphur occurring in the gypsum and gypsiferous marls.

BUILDING STONES.

The building stones of Nova Scotia are principally granite and sandstone. The various grades of the latter are procured principally from the upper divisions of the carboniferous system. Pictou, Colchester, and Cumberland Counties, therefore, are the principal producers. Many of the quarries in these counties have yielded stone for the construction of the public buildings of the Maritime Provinces, and of the New England cities. The granite of Halifax, Shelburne, and Ship Harbor is of excellent quality, and is largely used in foundations, steps, etc. Among other building material may be mentioned marble from Cape Breton, and limestone from Pictou and Antigonish Counties. The celebrated fortress and city of Louisburg was largely constructed of local crystalline diorite.

Slates of excellent quality occur in large quantities at Rawdon, Hants Co., and at several other localities, but at present they are in little demand, as roofs are covered with wooden singles.

Brick Clays of excellent quality abound in many places, and are worked to a small extent. The cheapness of wood has hitherto retarded the introduction of brick as a material for building purposes, except in the towns. However, brick buildings are gradually coming into more general favor, and a new market has been opened up in the manufacture of drain tiles, which are used in large quantities.

Among miscellaneous minerals may be mentioned plumbago, fire clay, refractory stone, soapstone, felspar, kaolin, infusorial earth, etc. These are known to exist in the Province at numerous points, and in quantities admitting of economic development, but at present the demand is not large enough to direct particular attention to them.

TENURE OF MINERAL LANDS.

The grant of lands to the early settlers in this Province contained no regular reservation of minerals, in some instances gold, silver, and precious stones only were reserved, in other cases the gold, silver, iron, copper, lead, etc., were retained for a source of revenue to the Crown. After the agreement with the General Mining Association, the Government passed an Act by which they retained in previous grants the gold, silver, coal, iron, copper, lead, tin and precious stones whenever reserved, and for the purposes of revenue made the above reservations in all future grants. This Act releases to the owner of the land all

gypsum, limestone, fireclay, barytes, manganese, antimony, etc., etc., and any of the above reservations, whenever they are not specified in the grant. There is no complete list published of all the grants, but information as to every grant can be obtained at the Crown Lands Office. The Department of Public Works and Mines is charged with the collection of revenue from the mines, the enforcement of the Mines Regulation Act, etc. Reference has been already made to the mode of granting gold licenses and leases, and the same remarks apply to silver and its ores. For all other minerals held by the Government for revenue purposes a somewhat similar system is adopted.

On application a tract not exceeding five square miles, called a License to Search, can be obtained for one year at a cost of \$20. Out of this the applicant may select, before the expiration of the term of one year, a tract of 640 acres, (one square mile,) for which he pays \$50. This is termed a right to work, and lasts for two years, and can be renewed for a further term of one year, on payment of \$25. During the existence of this right to work, the holder, if he commences *bona fide* mining operations, is entitled to a lease for twenty-one years, and renewals for three further terms of equal length. Provisions are made for securing the surface ground needed for mining, for proper returns, and for forfeiture on neglect to comply with the requirements of the lease, etc.

All the regulations connected with the leasing and working of the Provincial mines are framed with the view of affording all proper and necessary facilities to those desirous of entering into mining operations, and among not the least of these advantages may be mentioned the security of the title granted and registered by the Government.

The following are the rates of royalty paid by those holding under the Government:—

Each licensed mill owner shall pay or cause to be paid, in money, in weekly or other payments, as the Commissioner of Mines shall order, to the Commissioner or to the Deputy Commissioner for the district, a royalty of two per cent. on the gross amount of gold obtained by amalgamation or otherwise in the mill of such licensed mill owner, at the rate of nineteen dollars an ounce troy for smelted gold, and eighteen dollars an ounce troy for unsmelted gold, and of two per cent. on the silver, at the rate of one dollar per ounce troy.

Coal.—Seven cents and one half of a cent on every ton of two thousand two hundred and forty pounds of coal sold or removed from the mine, or used in the manufacture of coke, or other form of manufactured fuel.

The words "removed from the mine," in the preceding section, shall not be held to apply to coal used for domestic purposes by the workmen employed in and about each mine; nor to coal used in mining operations in and about the mine from which such coal has been gotten; but coal so used shall not be liable to pay royalty.

Copper.—Four cents upon every unit, that is, upon every one per cent. of copper contained in each and every ton of two thousand three hundred and fifty-two pounds, of copper ore sold or smelted.

Lead.—Two cents upon every unit, that is, upon every one per cent. of lead contained in each and every ton of two thousand two hundred and forty pounds, of lead ore sold or smelted.

Iron.—Five cents on every ton of two thousand two hundred and forty pounds of ore sold or smelted.

Tin and Precious Stones.—Five per cent. on their values.

COAL TRADE.

The total sales for the year 1885 amounted to 1,254,510 tons, made up of 778,378 tons of round, and 247,676 tons of slack coal, and 228,456 tons of run of mine coal, as compared with 1,261,650 tons sold during the year 1884, comprising 945,518 tons of round and 316,132 tons of slack coal.

The following are the most noticeable points in the coal trade:—

The home sales were 444,652 tons compared with 493,050 tons in 1884, and 471,327 tons in 1883.

The Province of Quebec took 493,917 tons, against 396,782 tons in 1884, and 410,605 tons in 1883.

The sales to New Brunswick were 148,634 tons, compared with 158,420 tons in 1884.

Newfoundland took 74,322 tons, against 86,216 tons in 1884.

The sales to Prince Edward Island were 52,770 tons against 50,399 tons during the preceding year.

The West Indian sales have again decreased, being 5,732 tons against 9,595 tons during 1884, and 31,860 tons in 1883.

The sales to the United States were made up of 10,497 tons of round and 23,986 tons of slack coal, against 64,515 tons in 1884. These sales to the United States are the smallest recorded since the year 1850.

CUMBERLAND COUNTY.

The total sales of this county amounted to 340,535 tons against 258,405 tons in 1884, and 222,347 tons in 1883.

The home sales were 83,953 tons, against 59,502 tons during the preceding year.

The sales to New Brunswick were 92,872 tons against 93,724 tons during 1884.

The Province of Quebec took 163,303 tons, as compared with 104,243 tons in the year 1884.

COLLIERIES.

Chignecto.—During the past year a few men were employed at this mine, and the air ways, levels, etc., were kept in repair. The output was 6,084 tons.

Joggins.—Work has been continued in the new slope, and the levels are now over one thousand feet to the eastward. The seam presents the following section :—

	ft.	in.
Top coal	3	6
Fire clay	1	6
Bottom coal	2	0
	<hr/>	<hr/>
	7	0

A new furnace 7 feet by 5 feet above the bars has been put up, with a column of 100 feet. The output of the mine was 17,664 tons against 25,034 tons in 1884.

Minudie.—During the shipping season work was continued as usual at this mine, and the output was 7,702 tons as compared with 10,023 tons during 1884.

At the Milner Mine a little work was done, and Mr. S. E. Freeman, during the fall, opened out the slopes in the old Lawson Mine, and extracted some coal.

Springhill.—The operations of the Cumberland Railway and Coal Company have been pushed with their usual enterprise. The sales for the year are the largest for any single company, being 335,055 tons, against 232,481 tons during the preceding year. The development of the South slope has been continued, and further exploratory work carried on in a recently acquired property lying to the south east of it. The underground operations have been continued as usual.

The Company are now preparing to extend their railway from its present terminus at Parrsboro Village to the mouth of the river, and to construct at that point a dock for coal shipments on a large scale. This arrangement, when completed, will provide an outlet which will probably assure the control of the Bay of Fundy and the St. John coal trade to this district.

The Saltspings Colliery engine house was burned down during the summer, and the company have not resumed work. Mr. W. Patrick continued opening out his mine at Maccan, which yields a coal of very superior quality, and is now prepared to ship steadily.

PICTOU COUNTY.

The total sales were 396,000 tons against 464,181 tons in 1884.

The home sales were 209,428 tons, against 262,780 tons during the preceding year.

The Province of Quebec took 145,363 tons, compared with 139,934 tons in 1884.

The sales to Newfoundland, Prince Edward Island, and New Brunswick remain about the same as in 1884.

COLLIERIES.

Acadia.—Work has been continued with customary regularity. The new pump has been found to work well. As it is the heaviest single lift in America, the following notes will be of interest:—

The mine is opened by a slope 2400 feet long, vertical depth 1000 feet. The pump is a Knowles of the duplex compound condensing type, with high and low pressure steam cylinders, 12 and 22 inches in diameter, 24 inch stroke with four $5\frac{1}{2}$ inch plungers working against a head of 435 lbs. per square inch. The column is six inches in diameter, of wrought iron, the air chamber is 30 by 15 inches, the steam pipe, 2600 feet long, and four inches in diameter takes the steam from Babcock boilers on the surface, at a pressure of 105 pounds. The pipe is protected with an infusorial earth jacket, the material being taken from a local deposit. After a year's service this pump has given no trouble, and no joints have leaked. There is no suction on the pump, the lower valves being below the level of the pump. The pump usually makes 10 double strokes a minute, but could run 25 strokes, equal to 100 feet piston speed a minute. A small hydraulic ram will raise the water from the lower level to the pump.

Albion.—There is little new to be noticed at these works during 1885. The McGregor pit was closed during the summer, as the coal trade was dull. The slack from the Third Seam was used at the Coke ovens and found to answer well. During the past season new ropes were put in the Foord Pit Shaft, and the level of the water was lowered by tanks. By utilising the plant at this point, the expense of new pumping gear in the Third Seam winnings is obviated. The output was 129,195 tons against 201,557 tons during the preceding year.

Intercolonial.—The main slope is now 2650 feet long, the underground engine hauling 950 feet, and the surface engine hauling the remainder of the distance. During the summer a tendency to "creep" which showed itself on the 1700 feet level was checked by cutting out a few pillars. No work was done in No. 4 Slope, and in the new pit. The output was 109,139 tons compared with 120,656 tons in 1884.

Montreal and New Glasgow.—During the year 1885 a little work was done on this area by Mr. Muir, and the coal extracted was favorably received in the New Glasgow market.

Vale Colliery.—Operations in the McBean Seam were interrupted for a short time by a serious accident, attended with much loss of life. From examinations made by me, I was led to believe that the ignition and explosion of a comparatively small amount of gas was extended by the combustion of coal dust. More particulars will be given further on in the report. The results of the investigations made by me and Mr. Madden, Deputy Inspector, are given by him in his report.

The Six Feet Seam is now opened and in full working order. A very fine pair of winding engines has been put up, with the necessary

heapstead, screens, branch railway, etc., and will prove an important factor in the future coal trade of the district. The output was 76,125 tons against 73,529 tons in 1884.

CAPE BRETON COUNTY.

The total sales during the past year from Cape Breton County were 517,975 tons, compared with 539,064 tons in 1884.

The home sales were 151,371 tons, compared with 179,768 tons in 1884.

New Brunswick took 28,498 tons against 39,463 tons in 1884.

The Newfoundland sales were 69,833 tons, compared with 83,143 tons during the preceding year.

The sales to Prince Edward Island were 13,613 tons against 19,056 tons in 1884.

The sales to Quebec show 215,254 tons, compared with 152,605 tons in 1884.

The West India trade showed only 5,618 tons against 21,872 tons during the preceding year.

The trade with the United States was only 33,788 tons, compared with 62,565 tons in 1884.

COLLIERIES.

Sydney.—Operations at this colliery were interrupted last spring by a serious fire, which was only extinguished by tapping the metal tubbing of the shaft, and drowning out the district in which the fire was situated. In the fall an opening was made into the Francklyn submarine lease, and operations will be continued as far as the rise as the cover will permit. The output was 124,274 tons, against 149,378 tons in 1884.

Victoria.—This mine may now be considered in full working order, the output for last year being 47,614 tons. Surveys have been made for the extension of the railway about $2\frac{1}{2}$ miles to the Barasois, where an opening is being made on the Barasois seam. Should the road ultimately be extended to Lingan, and the artificial harbor at the latter place be abandoned, the company will be in a position to meet any demands for coal at their pier at the South Bar.

Lingan.—Work here presents no new features of interest. The output was 21,761 tons, compared with 23,404 tons in 1884.

Reserve.—Work has been continued briskly at this mine during the past season. The dip slope has reached the Emery Seam, and preparations are being made to win out pit room. The engines, shops, etc., having been concentrated at the Reserve Mine, the company will

be able readily to carry out their plan of working all the areas from this point. The output was 83,276 tons, against 87,216 tons in 1884.

International.—Operations at this mine present no new features. The main dip is now 2000 feet in length, and the levels are being steadily advanced to the east and west. A new shop for locomotive and other repairs, and a new office, have been erected. The output was 67,959 tons, compared with 87,485 tons in 1884.

Bridgeport.—Mr. Henry Mitchell has completed fitting up his colliery, and is now ready for steady work. During the past season he raised 13,178 tons of coal.

Little Glace Bay.—No change has been made in the operations of the mine. The output was 39,400 tons, compared with 36,138 tons in 1885.

Caledonia.—The extraction of coal has been continued in the pillars. A dip plane has been driven down a short distance west of the pit bottom, and the coal is raised by an underground engine. The output was 58,859 tons against 69,461 tons in 1884.

Ontario.—A little work was done in the upper level of this mine, and a few cargoes shipped.

Block House.—The work of extracting pillars was continued during the summer, and was facilitated by the dryness of the season. The output was 11,075 tons against 22,668 tons in 1884.

Gowrie.—A pair of dip slants are being pushed from a point east of the new shaft, and have opened up a fine tract of coal. The question of utilising slack coal is being tested by the Messrs. Archibald. They have erected a Yeadon patent Briquette machine. Roughly speaking, the operation consists in thoroughly mixing the slack with pitch and compressing it into bricks under a heavy pressure. Mr. Charles Archibald writes :—

“The Briquette Plant is capable of making fifty-four tons of briquettes in ten hours. The weight of each brick is about $11\frac{1}{2}$ lbs., and we allow 195 bricks to the gross ton (2240 lbs.) The briquettes are made from the fine coal and eight to nine per cent. of coal tar pitch. This fuel is particularly adapted for steam purposes, and is most suitable for locomotives. It is easy on fire bars and leaves fine ashes. We expect to get a market in the West Indies and South America as well as a market in the Dominion.”

The output of the mine was 74,414 tons against 89,384 tons in 1884.

GOLD.

The returns show that 157,421 days' labor were performed, and that 28,890 tons of quartz were extracted and crushed, yielding 22,203 oz., 12 dwts. of gold, during the year.

I am pleased to be able to state that the anticipations of a good year's work, ventured in my last report, have been verified, the yield having exceeded that of the preceding year by 6,124 ounces, and being the largest recorded since the year 1867, at which period the yield was:—

•	1865.....	25,454 ounces.
	1866.....	25,204 "
	1867.....	27,314 "

Encouraging as this may appear, it is still evident that when a comparatively small production, such as this is considered, the failure of one or two productive mines will seriously affect the year's total. Since the year 1862 the total annual production has varied between 7,275 and 27,314 ounces, an amount totally out of proportion to the known richness of many districts, and the extent of auriferous ground. I would strongly urge upon our gold miners the importance of testing and developing all possible supplies of low grade ore. Several districts are known to contain large bodies of such ore, and in this country, with its abundant water power, cheap supplies and labor, and its favoring climate, gold mining must, in my opinion, seek its future expansion in this branch of the business.

DISTRICTS.

CARIBOU.—The returns for 1885 show that 2,239 tons were crushed, yielding 1,335 ounces, as compared with 1,559 tons yielding 966 ounces in 1884. There was some work done by Mr. Touquoy, and by Mr. Wright on the Heatherington property. The Lake lead, opened during the preceding season, was worked successfully.

At **MOOSE RIVER** a good deal of work was done by tributors on the little North lead on the Moose River gold mining property. Mr. Touquoy prospected to the west of this property, and found a new eight inch lead, good for about one ounce to the ton.

DARR'S HILL.—The Dufferin Gold Mining Company have concluded a highly satisfactory year's work. The main shaft is now about 150 feet deep, and toward the east the vein has been found to increase in width and richness. There were 10,880 tons of quartz crushed, yielding 4,924 ounces of gold, the total yield being to the

end of 1885, 18,047 ounces from 33,253 tons of quartz. Another equally promising lead has been found here.

FIFTEEN MILE STREAM.—The operations of the Hall, Anderson Company were continued on the lodes referred to in previous reports, until midsummer, when work was stopped. Mr. Hudson continued working, and steady returns have been made from his property, and it is to be hoped that the regularity and persistence of his operations will again bring this district into the prominent position it merits.

GAY'S RIVER.—A little work was done here at one or two points.

MONTAGU.—During the year 1885 the New Albion Gold Mining Company continued to work the DeWolf and Twin leads. The returns show that 2,809 tons yielded 4,001 ounces, placing this district second in the rank of the gold producing localities of the Province.

The deepest shaft, No. 1, on the DeWolf lead, reached a depth of 150 feet, and stopes were carried along the vein for a distance of about 700 feet. On the Twin lead stopes were driven about 500 feet, the main shaft being 150 feet deep. During September a very rich paystreak was struck, which yielded 1,369 ounces from 337 tons of quartz. As is not unusual, the quartz surrounding this streak proved during the remainder of the year, comparatively low grade. Operations in this lead have been continued, and the Twin lead is proving richer. A new lead called the Iron lead is being opened up.

Some prospecting was done by Mr. Oakes and others to the south of the New Albion area.

OLDHAM.—Mr. McDonnell and others continued their shaft, referred to in my last report, to a depth of 200 feet. In the fall operations were discontinued, pending the erection of steam power for more efficient pumping and hoisting purposes.

Mr. Hardman continued working to the westward of Mr. McDonnell, and has opened up an unusually rich lead, promising large amounts of mill ore. He has perfected his arrangements for pumping and hoisting at his main shaft, by power generated by a motor driven by the water power at his crusher, distant about one half a mile. Some quartz was taken out by the Messrs. Donaldson and others, but the principal operations were confined to the points referred to. The returns show that 1,170 tons of quartz yielded 2,360 ounces of gold.

RENFREW.—Mr. Hayward continued to work the Empress Mine and is now getting into excellent ground. Crushing was at a standstill during great part of the season, owing to an unusually dry spell. Mr. D. A. McDonald and Mr. Rae also did some work. The returns show a yield of 639 ounces from 641 tons of quartz.

SHERBROOKE.—Operations in this district present few points of interest. The depression which characterised the season of 1884 has continued, the returns for the past year showing 1,238 ounces from 2,426 tons of quartz. Although several veins on the north dip have

been worked to a considerable depth, the belt hitherto operated is a narrow one, and it is to be hoped that fortunate discoveries may increase the width of productive ground. In view of the depth to which the northerly dipping veins have been followed, it hardly appears possible that the gold in the south dipping veins can be exhausted at the shallow depth to which they have been worked.

In the early part of the season Mr. Williams worked in the New York and Sherbrooke areas, and Mr. Cameron opened a small lead north of the former workings on the Wellington. The big pump was started to take out enough water to permit a test of a lead lying close to the Dewar. Work was also done on the Caledonia and Alexandria properties by Messrs. Brown, McNab and others. Mr. G. May did some work on the Meridian, in the old seven feet workings. On the Pactolus some work was done in the untried ground to the west of the open cut.

At Cochran Hill a little work was done by Mr. Cumming, and in the fall Mr. R. P. Fraser repaired the mill at the Crow's Nest, and resumed work, and also tested several promising new leads.

STORMONT.—The Gallagher Gold Mining Company continued mining on the leads referred to in previous reports, but on a smaller scale. A lead was opened at the mouth of Country Harbor, and preparations made for systematic mining.

TANGIER.—This district has shown little improvement last year. In the spring some work was done by the Essex Company, and work was continued on Strawberry Hill by Mr. Townshend. Mr. J. Irvine continued working at Mooseland.

In the spring a little work was done on the Pittsburg area, and in the fall the discovery of a large and rich lead was reported from Clattenburg's Brook, West Tangier.

UNIACKE.—The returns show that 576 ounces were extracted from 2010 tons of quartz, an average of 57 dwts. Operations were continued by Mr. Davidson, Mr. Prince, and others, but no new work of interest was performed.

WAVERLEY.—In this district Mr. Huff continued prospecting, and in the fall opened a lead on American Hill, which promised well. Some work was done on the veins near the western mill.

UNPROCLAIMED, ETC.—At Wine Harbor, Mr. Colchester worked on a lead yielding about 15 dwts. to the ton.

YARMOUTH.—The Kemptville mines have been successfully operated during the past year, and the district has proved the most promising of any yet opened to the west of Halifax. The returns show 624 ounces from 133 tons of quartz.

Some work was also done at Pubnico, a trial lot yielding 64 ounces from 5 tons of quartz.

At Lake Catcha work was continued by the Oxford Company on the leads already opened, and leads in areas 227 and 228 were worked. Other parties are making preparations for work, and it is anticipated that the year 1886 will show an improvement in the returns from this district.

At Millipsigate, Messrs. Hall and Owen, and others worked on leases 311, 282, and 284.

At Whiteburn (Caledonia), Queen's County, the Messrs. McGuire have opened up a lead on their property to a depth of about 20 feet, and have taken out some unusually rich quartz yielding at the rate of 17 ounces to the ton. They have made arrangements to put up a steam mill, and to begin regular work in the spring. Messrs. Hall, Owen, Barss, and Messrs. Cole, Telfer and Annand, prospected the ground north of McGuire's, and proved about ten gold bearing leads from 4 to 12 inches in width. Trial crushings of quartz from some of the larger veins showed 3 ounces to the ton. These leads will be worked in the spring. Prospecting was also carried on at Brookfield.

RAWDON.—Mr. McNaughton has continued working the Sims lead, which has been opened over a length of about 900 feet. The returns show 1,173 tons crushed for a yield of 2,759 ounces. Some prospecting was done in the vicinity of this mine, and there appears to be a large extent of auriferous ground in this district.

IRON MINING.

During the year 1885, the operations at the Mines of the Steel Company of Canada were continued as usual. Large quantities of the white "Spathose" ore were extracted from the west mines. Promising bodies of ore were opened up to the east of the Folly Mountain Mines.

At Bridgeville, on the East River of Pictou, further explorations were made on the Saddler area, by Mr. J. H. Bartlett and Mr. R. P. Fraser, of Pictou. Mr. William Grant also mined about 80 tons of limonite, part of which was shipped to the Londonderry furnaces.

GYP SUM.

Operations were continued as usual in the quarries in the Windsor district, but the exported tonnage was less than in the preceding year. The Messrs. McCurdy of Baddeck, shipped some plaster from St. Ann's Harbor, and some work was done by Mr. C. A. DeWolf, at the Lennox Passage quarries.

ANTIMONY.

The operations at the Rawdon Antimony Mine have been steadily continued during the year. A large and well timbered shaft has been sunk near the road, clear of the vein; and through it all future operations of pumping and winding will be carried on. The returns show that discoveries of Antimony ore are reported from Kentville, and from the Melrose district, Guysboro' County.

COPPER.

During the past season Mr. M. F. Egar did some work on a promising deposit of copper pyrites near Pinkietown, Antigonish County. Dr. Johnstone and Mr. J. McNeil proved some rich ore in the same locality.

At Coxheath, near Sydney, in Cape Breton County, the Coxheath Copper Company have had a line of railway six miles in length surveyed from the mine to Lime Point, on Sydney Harbor. Land has been secured and arrangements made for erecting a large establishment for treating their own and foreign ores, for conversion into matte. It is stated that contracts extending over terms of years, have been made, which guarantee abundance of ore in addition to the large amounts which recent exploratory work has shown in their own mine. Towards the close of the year more powerful pumping and winding gear were erected, and the compressed air drill plant enlarged to the dimensions originally contemplated, and the sinking of the shaft and extension of the preliminary levels vigorously pushed. It is confidently believed by the Directory of the Company that the essentials for the successful prosecution of a large copper reducing business exist at this point. Certainly the conditions of cheap fuel, limestone, iron ore, water carriage, etc., etc., cannot be surpassed. Trial runs made under the superintendence of Dr. Peters, the well known copper expert, with Coxheath ore, Reserve coke, and local fluxes of Sydney limestone and iron ore, gave the greatest satisfaction, yielding copper matte of excellent quality, with an insignificant loss of metal. The establishment of this undertaking would open a market for the many deposits of rich copper ores known in Antigonish, Pictou, Colchester and Cumberland Counties, which have not yet been worked.

MANGANESE.

Mr. J. W. Stephens continued working at Tenny Cape and Walton. The Messrs. Churchill are reported to have found good ore at Hantsport. Messrs. Thompson and Foster tested a bed of manganese ore near Kentville, which is stated to be suitable for making ferromanganese. On the Salmon River, near the Valley Station, work was continued by Messrs. Carter, Archibald and others, and about 60 tons of ore mined. The ore occurs as a gravel lying on sandstones in the vicinity of carboniferous limestones, and as irregular veins cutting the measures. The Hon. E. T. Moseley continued working at the Morrison mine at Salmon River, Cape Breton.

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER AND CUMBERLAND.

WESTVILLE, PICTOU CO., N. S.,

December 31st, 1885.

E. GILPIN, Esq.,

Inspector of Mines:

DEAR SIR,—I have much pleasure in forwarding you a condensed statement for the past year of my work as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland.

VALE COLLIERY.

I was at this mine very frequently during the year, in all 22 times. On February 10th, a serious explosion took place in the McBean Seam, by which thirteen men lost their lives and five were seriously injured. I was in Cumberland County at the time, and arrived at scene of disaster on the 12th, and remained for some length of time investigating the cause of the accident.

On April 6th I went down the McBean Seam to the point where the men had been working at the time of the explosion, and examined a hole at that point which was supposed to have been fired on the night of the explosion, and which some of the officials consider caused the explosion. The cause of the explosion at the Vale Colliery is a matter of dispute amongst experts, but the most reasonable solution appears to be as follows:—On the west side of the slope at 1300 feet level were two check doors, which, when shut, sent the air circulating down the slope, but if opened the air would rush to the upcast, as an exhaust fan is situated on that side, and thus the lower part of mine would be cut off from the air communication, which, if allowed for any length of time, would undoubtedly accumulate gas; from appearances, I would judge this to have transpired, and gas to have been generated in the manner supposed. Gas then having been driven down by the restored action of the air, was forced upon Foley's lamp, who was working in a head about 100 feet from sinking-face. He was burned almost to a crisp, whilst two-thirds of the men below him had scarcely a singed hair. Whilst sinking they drive leads east and west from back slopes, at intervals of about 60 feet, at right angles to slopes, which are cut again at the face coming up the hill with shoots. Heads driven up the hill off the air current, any distance, and left standing, will fill with gas; this has been an occurrence before the explosion and since, which would lead me to believe that the air current must

have in some way been tampered with, and the restored action resulted as I have stated. In support of this view, I would say that the timbers in the slopes from the head in which Foley worked "downward," that is toward the sinking face, gave unmistakable evidence that the explosion came from above, whilst the timber above this head gave like evidence that the explosion came from below, until it reached the 1800 feet level, which is some 400 feet above the head, then it expanded east and west, destroying the check-doors on the levels, and showing slight signs of the explosion for a distance of 200 or 300 feet in the levels inside the doors, which were from 70 to 100 feet off the slope. The stoppings between the main slope and back slopes from this level up to 1300 feet level were blown down. Strange to say, the first check door at 1300 feet level on west side was found standing open, whilst the inside door was destroyed. At this point there were men employed taking timber from the slope to some point inside of the doors. The explosion had gone in this level a distance of not more than 200 or 300 feet. The stoppings from 1300 feet level to mouth of slope were blown down and timber and debris were strewn in a confused way all through the slope.

The force of the explosion seems to have been spread over the area I have mentioned, viz., on the main slope and back slopes, and extending east and west from main slope a distance of from 200 to 300 feet, over which area the timber was in many cases blown down, and falls of roof took place, while the working faces on the east and west side of pit were free from any appearance of explosion, and in as good order after as before.

After the mine resumed work and the water was extracted, a hole was discovered at the working face of the sinking. The evidence brought to show that this hole was fired before the explosion, did not appear conclusive.

On November 26th, I experimented with dynamite in this mine, and believe that under favorable circumstances it might be used with advantage for some coal mining purposes.

HALIFAX COAL COMPANY.

Slopes Nos. 1 & 2.—During the year I visited those slopes 12 times. On my inspections I found that the management kept the mine in good order, and in compliance with the law. Gas during the entire year was to some extent given off in No. 2 slope.

McGregor Pit.—This mine was idle from and including June 3rd. I made several official visits, on which occasions, after travelling the working faces and airways, I found they were in satisfactory condition. In December I travelled the workings to the rise and found the airways, etc., in excellent condition.

ACADIA COAL COMPANY.

Acadia Colliery.—I made official visits to this mine 12 times during the year. Work was carried on to every appearance in a satisfactory and systematic manner. They have sunk the new lift a

distance of some 600 feet, making the total depth of this slope on the angle 3100 feet, or a vertical depth of 1307 feet. A pump of the Knowles pattern has been added to this mining plant, which is capable of performing all the duty required.

INTERCOLONIAL COAL COMPANY.

Nos. 1 & 2 Slopes were visited by me twelve times. During the summer a weight came on the pillars of the 1700 feet level which caused a creep, and in September, on my visit, I learned that the pillars, which were being extracted from three lifts, viz., on the 1000 feet, 1300 feet, and 1700 feet leads, were successfully extracted from the two first named, but owing to the creep on 1700 feet level, as large a percentage of coal could not be got from it as the others. In August the management ceased pumping at the Scott pit, which is sunk to the second seam. During the year gas was reported in pillar workings, upon which the use of powder was discontinued. I have found the air, as regards quantity, all that could be wished for, and the air passages kept clear.

Alexander Grant and John Muir have done a considerable amount of work on a seam of coal at Coal Brook, a short distance east of New Glasgow. They have erected a small winding engine and force pump. The coal in slope presents a troubled appearance, but in the bords driven eastwardly it is of a more regular form.

CUMBERLAND COUNTY, SPRING HILL MINES.

I visited these mines ten times during the year. On my visit in March there was some gas reported on the west side of west slope, the law was complied with and shot-firers appointed. In November the airways of west slope, which had become partially unsafe, were being retimbered, and in December I ascertained it was all in good condition. The South slope at this date was down a distance of 830 feet and sinking operations still continued. The coal has as good an appearance at this point as it had at the start. There is another seam of coal 11 feet thick, which presents a good appearance, underlying this seam. A small shaft is sunk on it, and considerable prospecting has been done with good results.

CHIGNECTO.

I visited this mine ten times during the year. This mine is in good order, and the air all that could be desired, but for some cause the mine has not been in very active operation during the year. But it is in order to make a large output of coal whenever it is requisite so to do.

JOGGINS.

I visited this mine ten times during the year, namely :—January 12, February 11, April 13, May 18, June 23, July 18, August 11, October 13, November 17, December . This mine has been idle for a good part of the year. I travelled working faces and airways, and found all in good order.

MILNER MINE.

John Hurley left this mine about the middle of the year, and Alexander Dewar had charge until about October. From 3 to 8 men were employed in it for the most part of the year. I have made ten official visitations to the works and found volume of air, etc., satisfactory. Since October Mr. Ripley has taken charge of this mine.

MINUDIE.

I paid ten visits to this mine during the past year. This mine has been doing a little for the most part of the year. The air is good. They still continue the long-wall system with fair results.

SCOTIA.

I visited this mine ten times during the year. On June 24th, at date of a visit, I found that fire had started on west side of new slope; in July it was to appearances extinguished, but I am strongly of opinion that it is there still. In August they had shut down the old slope and started to open up a new slope, and they completed this work in September, and since that date they have been taking out coal

S. E. Freeman in August commenced operations on the old Lawson mine, and has driven down the old slope sixty feet, and has since had a few men to work getting out coal.

SALTSPRINGS MINING CO.

This mine was also regularly visited by me. In January they had everything in preparation for sinking, and in March were down 137 feet, in April levels were driven off 140 feet. During my subsequent visits the mine was idle, and unfortunately the engine house was burned down in September, and from that time operations ceased.

WILLIAM PATRICK & CO.

In this mine in the summer Mr. Patrick started 2 or 3 men to work, and had been gradually increasing the number as the mine was opened up, until they had 9 or 10 men to work at the end of the year. The water is extracted from the works by means of a syphon. The seam is about 2 feet thick and of excellent quality.

The foregoing is a condensed statement of my work on the past year. I have likewise appended tables shewing the volume of air in each mine, the number of accidents, etc., etc.

Accidents during the year 1885, in the Pictou, Cumberland and Colchester Mines.

No	Date.	Name of Mine.	Person.	Occupation.	Remarks.
1	Feby. 10	Vale Colliery	John Campbell	Overman .	Killed by explosion.
2	"	" "	Neil McKinnon	Driver....	
3	"	" "	P. McBeth....	Stableman	
4	"	" "	H. Cameron ..	Pumpman.	
5	"	" "	D. Kennedy ..	Loader....	
6	"	" "	J. McLean....	Bottomer .	
7	"	" "	J. McEachern	do.	
8	"	" "	P. Foley.....	Miner	
9	"	" "	T. Ryan.....	Bottomer .	
10	"	" "	J. W. Fraser..	Miner	
11	"	" "	J. Grant.....	do.	Injured by explosion.
12	"	" "	D. McNeil....	do.	
13	"	" "	Joe Haggart..	do.	
14	"	" "	A. McDonald..	.....
15	"	" "	J. Robertson..	.....
16	"	" "	J. Guthro ..	.....
17	"	" "	H. Lamont....	.....
18	"	" "	R. Love .....	.....
19	" 29	Acadia	Charles Reid...	Miner	Hands burned with gas.
20	April	Saltsprings..	Mike Murphy ..	do.	Collar bone broken.
21	" 28	Acadia	— McDonald..	Driver....	Jammed with boxes.
22	May 16	Drummond .	Nor'an McKenzie	Cageman .	Jammed between prop and cage.
23	" 27	" "	— Leadbeater	Driver....	Leg broke.
24	" 27	Spring Hill.	Angus McLeod..	Miner	Foot smashed.
25	Aug. 28	" "	Don'd McDonald	do.	{ Legs broken; died in a few days after accident.
26	" 28	Spring Hill.	John Scully	do.	Killed; run over by cage.
27	Sept. 24	Vale	John Guthro....	do.	Burned with gas.
28	" 24	"	Charles Guthro..	do.	" "
29	" 25	"	John O. Hanley.	do.	" "
30	Oct. 8	Albion	James Ferguson.	Trapper...	{ Leg broke; empty rake on slope run over him.
31	Nov	Patrick Mine	John McGilvray.	Miner	Leg broke riding on boxes.
32	Dec....	Spring Hill.	— Wilson	do.	{ Seriously burned by an explosion of powder.
33	Dec....	" "	— Hoslem	do.	{ Arm broke by a piece of coal from the working face.
34	Nov	" "	George Wallace..	do.	

Table shewing the Quantities of Air in cubic feet per minute, as measured by me in the Cumberland and Pictou Collieries, during the year 1885.

COMPANY.	MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Halifax Coal Co., Stellarton...	McGregor Pit	59,691	59,010	67,449	72,708	76,298	76,790	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.
	Slope No. 1	19,000	19,500	34,500	27,750	24,750	27,600	21,000	24,000	23,250	23,312	21,750	26,850
	Slope No. 2	21,000	21,250	27,720	28,000	25,920	23,040	21,600	22,320	23,760	24,060	18,000	24,480
	Slope	67,000	92,500	90,000	96,900	96,000	95,000	89,400	91,000	88,220	99,050	97,900	95,000
Intercolonial Coal Co., Westville...	Slope	60,000	61,200	71,000	63,500	54,120	65,000	54,100	62,000	61,500	52,800	64,700	64,850
Acadia Coal Co., Stellarton...	McBean Seam	Idle.	.....	64,000	66,000	72,000	71,125	64,440	34,580	37,750	38,100	70,000	67,700
Vale Coal Company	Six Feet Seam	.....	18,000	17,700	15,000	11,330	12,090	12,000	19,000	25,000	29,400	32,200	32,000
	West Slope	17,550	.....	31,500	34,800	15,600	15,000	14,900	17,000	21,150	25,570	24,800	29,000
	East Slope	35,200	.....	22,000	14,700	33,000	32,000	32,600	31,000	30,000	31,408	32,520	31,600
	North Slope	Idle.	.....	35,000	30,000	31,650	27,300	24,500	25,600	41,000	51,600	50,800	51,200
Chiegnecto	Slope—Chiegnecto.	14,500	.....	17,000	15,120	17,100	17,600	16,150	13,000	12,700	12,300	13,800	17,200
Minudie	Minudie	Idle.	4,000	.....	4,800	5,000	5,400	4,000	3,600	.....	5,000	5,750	6,200
Joggins	Slope	Idle.	Idle.	Idle.	18,240	19,700	21,200	2,200	13,960	.....	12,200	13,300	Idle.
Boston Mining Company	Slope	3,200	Idle.	Idle.	4,000	4,500	5,000	4,050	7,000	.....	5,050	4,000	4,700
Scotia	Slope	4,300	.....	4,330	3,700	Idle.	.....	.....	5,000	.....	7,000	6,500	7,100
Lawson	Slope	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	1,200	2,000	3,000
Salsprings	Slope	Idle.	.....	3,700	4,800	Idle.	5,120	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.
New Glasgow Coal Company	Slope	.....	.....	1,800	1,800	1,875	1,940	1,960	2,000	2,000	2,520	5,600	6,000
Patrick Mine	Slope	.....	.....	Idle.	Idle.	Idle.	Idle.	.....	.....	.....	2,125	2,600	2,700

I remain, yours truly,

W. MADDEN, JR.,

Deputy Inspector of Mines.

CAPE BRETON.

BRIDGEPORT, *January 13th, 1886.*

E. GILPIN, ESQ.,

Inspector of Mines :

DEAR SIR,—I beg leave to hand you the following report as Deputy Inspector of Mines, of my work in the Island of Cape Breton for the year ending December 31st, 1885 :

SYDNEY MINES.

I visited this mine fourteen times during the past year. On January 20th fire was discovered in some of the old workings on the north side of the pit towards the dip. It was thought at first that it could be extinguished in two or three days, but it spread rapidly through the workings in spite of every effort made to put it out. It was then deemed necessary to flood that district. About the 16th of March work was resumed, as is usual, on the south side of the pit, and also on the north side towards the rise. A number of men were engaged splitting and taking coal from the pillars. In the meantime the water in the burnt district was lowered considerably, so as to admit of the miners going to work again in the boards on the north side.

VICTORIA MINES.

This mine has worked very steady the past year, the levels have been extended, and counter levels driven parallel to them for the purpose of ventilation and drainage. A new landing has been made at the bottom of the east slope, which gives more room. The ventilation in this mine is much improved, the fan is capable of giving a much greater quantity than shown on the table, if required.

BARASOIS.

At this mine a new parallel slope is being driven on the west side of the one driven last year. As they are extended towards the dip, the coal seems to improve in quality very much. There has been a large engine brought to this mine for the purpose of pumping and hoisting coal, etc. It is now in course of erection.

LINGAN MINES.

In this mine I cannot notice any considerable change. The work was carried on in the usual way, except a new return air course through a portion of the lower workings. The water discharged from the colliery is pumped by three home manufactured pumps in three lifts, one delivering to the other. No. 1 discharging to a level that leads to the sea shore.

OLD BRIDGEPORT.

At this mine a new hoisting engine of 50 horse power has been put up; also bank and pulley frames, screens, cages, and slides. In the pit the headways have been extended 468 feet towards the rise. The manager says that it is his intention this winter to drive one of these to the surface for a travelling road, and the other to a shaft to be sunk for a furnace. If this is done this colliery can be easily ventilated next season. There is no water pumped from this mine, as it runs to the sea shore through a water level. The workings are not yet driven below tide level.

INTERNATIONAL MINE.

At this mine the work under ground has been carried on as usual. The column pipes were replaced by new ones wherever required, and about 800 feet of piping was inserted. There is not as much water pumped from this mine as from most of the others, owing to a water level driven from the sea shore, which drains off the surface water between that and the crop of the coal. Also, there is no broken surface to the dip of this level.

RESERVE MINE.

At this mine the levels at the south side of the French slope have been extended, and an air shaft sunk on one of them; also, slants have been driven towards the dip. From North slants at six chains levels were broken off, and driven about two chains. From the south slants at ten chains bords have been broken off, but no levels driven yet. The drift has been driven from the Reserve to the Emery seam, and it is intended to sink an air shaft this winter on it.

CALEDONIA MINE.

At this mine a pair of slants have been driven on the west side of the shaft 500 feet to the dip. At 300 feet levels have been turned off right and left, and driven, and bords broken off, making two working sections in that district. The manager says that it is his intention to have those slants further driven this winter, to gain another lift. The pumps at this colliery are in two lifts or sets in the shaft, one pumping to the other.

LITTLE GLACE BAY MINES.

In the underground workings at this mine there has been no change made last year. The coal raised from the mine has been taken from bords already broken off. On the surface there has been a fine smokestack and six boiler seats built, and one new and two old boilers placed in. In a few days the other will be put in.

ONTARIO MINE.

At this mine the upper level has been timbered and cleared out to the face, and also a road laid in. The bords on the high side of this level have also been timbered, and crosscuts opened towards the furnace

for ventilation. The coal mined for the past season was taken out of this section.

BLOCK HOUSE MINE.

At this mine work has been rather dull. The coal mined for the past season was partly taken from pillars to the dip.

GOWRIE MINE.

In this mine there has been a pair of slants driven at the east side of the pit bottom fifteen chains and fifty links. Also the hanging roof along the main road has been down to make more room, and for the purpose of greater safety. A new engine, manufactured by the Ledgewood Manufacturing Company of New York, is being placed on the surface to haul the coal from the deeps. The pumps that are in the shaft are in two lifts; they are the ordinary perpendicular lifting pumps, the same as at Caledonia, Little Glace Bay, and Sydney Mines.

I beg to enclose you in tabular form number of cubic feet of air measured by me on my visits, number of tons of water discharged, number of tons of coal raised, etc. Also, table of accidents and their causes during 1885.

In conclusion, I would like to draw your attention to one particular thing, that is, the careless manner in which miners load horizontal holes bored in rock. It often happens that the holes are three-cornered, and during loading some of the powder remains in the lower groove, and is very often ignited by the stemmer. Such was the case with John Peck at Sydney Mines last year, and two others injured at the International in 1884.

Report of Accidents in Cape Breton Mines during 1885.

Date of Accident.	Name of Mines.	Name.	Occupation.	Remarks.
April 18	Reserve	Michael McMullin	Miner	Fall of coal from face.
May 28	Sydney Mines ..	John Peck	Miner	Explosion of gunpowder, blasting rock.
June 25	Sydney Mines ..	Thomas Mahar	Labourer	Run over by full trip on engine plane.
"	Sydney Mines ..	Neil McInnis	Labourer	" " "
August 5	Little Glace Bay	Hugh Campbell	Miner	Collar bone broken by fall of coal from face.
September 3.	International	Duncan Curry	Miner	Leg fractured by fall of coal from face.

Report of No. of cubic feet of Air passing through Mines in Cape Breton for 1885.

NAME OF MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines	10,000	10,000	25,230	31,325	36,000	40,000	.....	34,000	47,260	46,350	55,000	43,986
Victoria	19,320	19,000	18,000	19,200	15,580	20,000	28,850	28,000	31,370	.....	36,540	40,000
Barrasois .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000
Lingan	12,000	21,000	21,500	25,000	20,000	19,600	.....	18,000	21,500	.....	20,270	21,000
Bridgeport .....	.....	.....	3,000	3,400	.....	4,150	1,600	1,500	3,000	.....	5,000	5,000
International .....	.....	.....	.....	28,800	31,000	27,500	.....	28,500	26,000	.....	28,830	20,000
Reserve	20,000	.....	.....	16,300	26,000	27,400	30,000	22,000	24,300	.....	31,394	28,000
Caledonia	1,500	.....	4,612	27,500	28,000	32,200	34,640	36,000	37,734	30,523	29,000	7,500
Little Glace Bay .....	.....	.....	13,000	6,000	6,500	7,000	.....	9,230	14,000	9,000	9,750	10,000
Ontario .....	.....	.....	3,500	5,000	3,000	2,500	4,000	4,000	8,700	6,600	.....	5,500
Block House .....	.....	.....	.....	17,500	18,000	.....	.....	10,000	.....	.....	.....	18,000
Gowrie	15,000	.....	.....	22,500	20,000	19,500	16,500	20,000	24,130	20,000	25,300	.....

I remain, yours truly,

PATRICK NEVILLE,

Deputy Inspector of Mines.

Average weight of Water pumped during year ending Dec. 31st, 1885, compared with the weight of Coal raised during the same period.

NOVA SCOTIA.

COMPANY.	MINE.	APPLIANCES.	Gallons of Water per 24 hours.	Tons of Water raised year 1885.	Tons of Coal raised year 1885.
Intercolonial Coal Company.	Nos. 1 and 2 slopes.	1 No. 2 Cameron Pump.	35,000	63,875	109,139
		1 Nos. 3 and 4 Cameron Pump..			
		1 No. 3 do.			
Acadia Coal Company.	One Slope	1 Knowles Independent Condenser	86,400	157,680	98,150
	McBean seam, one slope.	1 Knowles Steam Pump.	25,200	45,990	76,125
Vale Coal Company	Six feet seam, one slope.	1 Cameron Pump	10,800	19,710	
		1 do.			
Halifax Coal Company	Douglas seam, slopes 1 and 2	1 Blake do.	15,600	28,470	129,195
	McGregor seam, shaft.	Water hoisted with Boxes	19,104	34,864	
	Foord Pit.	No. 8 Cameron Pump	1,056,000	(Ran only a portion of year.)	
Cumberland Railway & Coal Co., Spring Hill Mines.	East Slope.	Hoisted with Iron Tanks	307,627	561,419	335,055
	West Slope.	2 Blake Pumps			
Montreal and New Glasgow Joggins Mines	One Slope.	2 Cameron do.			20,210
		2 Allison do.	23,142	42,234	17,664
Milner	Slope	1 Burrel-Johnston Pump			200
Chignecto.	Slope	Cameron Pump.	14,400	26,280	6,084
Boston Mining Co.	Slope	Water level of this mine worked along out-crop of seam	Unknown		
Scotia	Slope	Same as preceding	Unknown		1,318
Minudie	Slope	No. 4 Cameron Pump.	17,666	32,240	7,702
Lawson Mine, per S. E. Freeman	Slope	Hoisted by Boxes	7,200	3,312*	115
W. Patrick & Co	Slope	Syphon	9,600	17,520	485

* This is for October, November, December, 1885.

CAPE BRETON.

COLLIERIES.	No. of Pumps.	Name and style of Pump.	Average gallons discharged per day.	Tons of Water raised during 1885.	Tons of Coal raised during 1885.
Sydney Mines.....	2	Double Acting.....	172,620	261,278	125,033
Victoria.....	2	Lifting Pump.....	139,863	227,901	47,614
Lingan.....	2	Double Acting.....	142,380	232,003	21,761
International.....	3	Built to order.....	80,124	131,056	67,959
Reserve.....	2	Cameron.....	7,275	117,885	83,276
Caledonia.....	2	Cameron, No. 6.....	115,984	334,000	58,859
Little Glace Bay.....	2	" 5.....	124,500	170,785	39,400
Block House.....	3	Lifting Pumps.....	86,400	334,678	11,075
Gowrie.....	1	No. 6 Cameron.....	205,384	268,457	74,414
Barasois.....	2	Lifting Pumps.....	648,720	535,252	130
Old Bridgeport.....	2	Knowles.....	139,984	.....	13,178
Ontario.....	2	Built to order.....	139,984	.....	7,779
		".....	328,264	.....
		Knowles' Special.....	.....	.....
		Built to order.....	.....	.....
		Sinking.....	.....	.....
		Natural drainage.....	.....	.....
		Totals.....	.....	3,646,889	1,352,205

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al.....	Tatamagouche	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others.....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James	East River.....	1
43	Hudson, James	" "	1
Total area under lease.....			19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.....	N. Side East Bay	1
91	Brookman, S. L.....	East Bay	1
93	Brookman, S., et al.....	" "	1
102	C. L. Ingraham.....	" "	1
103	A. McKenzie, et al.....	" "	1
92	Matheson, D., et al.....	" "	1
84	Protheroe, Pryse.....	Cow Bay	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co.....	Whycocomagh	1
Total area under lease.....			27½ square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	McKinnon, et al.....	ANTIGONISH CO.	3			
13, 14, 15	Black, C. H. M.....		3			
21	Bligh, James, et al.....		1			
47	Boston, C. M. Co.....		1			
25	Campbell, Alex., et al.....		1	.....	John Moffat ..	River Herbert
32, 34	" " ".....		2			
35, 48, 49, 50	" " ".....		4			
31, 33, 37, 38, 40, 41, 45, 46	Campbell, John.....		8			
54	Campbell, W.....		1			
12	Cumberland C. M. Co....	Chignecto	4	Working.	Jas. Baird.....	Maccan.
6, 7, 8, 44, 52, 55	} Cumberland R'y & Coal Co.	Springhill	9	Working.	R. G. Leckie.. } W. Hall }	Springhill.
17	Domville, James		3		E. N. Sharp..	St. John, N.B.
20, 42	Joggins C. M. Association..	Joggins	2	.....	P. McNaughton	Joggins.
18, 19	Joggins C. M. Co.....	Cumberland	2	Working.		
5	Macfarlane, A.....		2			
51, 53	Livesey, John		2			
1, 2, 3, 4	Lawson C. M. Co.....	Maccan	1			
	Milner, Christopher		2			
	New York & Acadia Co..	Scotia	4	Working.		Maccan.

16	Seaman, Gilbert .....	.....	1	Working.	<i>M. Dunlop</i>	River Herbert
24	Shannon, S. L. ....	.....	2			
36, 39	Shannon, S. L. (in trust) et al	.....	2			
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.) ..	.....	5		J. S. Hickman..	Amherst.
9	Victoria Coal Mining Co..	.....	2			
26, 27	Wright, John V. ....	.....	3			
			65			
PICTOU CO.						
1	Acadia Coal Co.	Fraser.	1	Working.	{ <i>H. S. Poole</i> .. <i>J. Maxwell</i> ..	Stellarton.
3	"	Acadia	1	"		Westville.
42	"	Pictou.	4	.....	
23	Allan, Sir Hugh, K't.	Vale	3	Working.	{ <i>J. B. Moore</i> .. <i>T. Turnbull</i> ..	New Glasgow. Vale Colliery.
10	Gray, B. G., et al. ....	.....	1			
11	Halliburton, R. G., et al..	.....	1			
	Halifax Co., (Ltd.)	Albion ...	4	Working.	{ <i>S. Cunard & Co</i> <i>J. Rutherford</i>	Halifax. Stellarton.
13, 14	Intercolonial Coal Co. ....	.....	2			
12	"	Drummond	1	Working.	Robert Simpson	Westville.
6	Kirby, Lewis R. ....	.....	1			
15, 30, 31	Merigomish Co. ....	.....	3			
25	Nova Scotia Co.	Black Diamond..	4		M. H. Angell..	Westville.
24	Richey, M. H. ....	.....	1			
			27			

LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		CAPE BRETON CO.				
3	Archibald, Blowers	Gowrie	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney Cow Bay.
2	Archibald, Thomas D.....	"	1			
5, 28	Blockhouse Mining Co.....	Blockhouse	2	Working.	R. Belloni	Cow Bay.
29	" (sea area) ..	.....	1			
72	Brookman, Samuel .....	.....	1			
76, 77	" S., et al.....	.....	2			
15	Caledonia, C. & R. Co.....	Caledonia	1	Working.	David McKeen...	Glace Bay.
31	" (sea area) ..	.....	1			
30	Campbell, Alex.....	.....	1			
8, 9	Halifax Coal & Iron Co..	Ontario	1½	Working.	T. D. Archibald... Jno. Sutherland...	North Sydney Pt. Caledonia.
87	Cossit, Geo. G.....	.....	1			
	General Mining Association	Bridgeport	2			
27	" " " (sea area) ..	Sydney	18	Working.	{ Rich. H. Brown. Cunard & Morrow	Sydney Mines Halifax.
	Low Point, Barasois, and..	"	4		{ H. Mitchell.... Donald Lynk....	Bridgeport. Low Point.
38, 39	Lingan Mining Co., (Ltd.)	Lingan	13	Working.		
10, 21	Gibson, John, et al.....	"	10			
4, 12, 16	Glance Bay Mining Co....	Glance Bay	2			
75	Henry, W. A.....	.....	3	Working.	{ E. P. Archbold. Chas. Rigby....	Halifax. Lt. Glance Bay.
22	Ingraham, J. L., .....	.....	1			
		Halfway	1			

[illegible]

LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		INVERNESS CO.				
5	Aylmer, John Evans Freke.	Cape Mabou	2		T. Evans.....	Chimney Cor.
8	Evans, Thomas.....	Chimney Corner.	1			
9	Evans, Thomas (<i>sea area</i>)	.....	1			
7, 12	Inverness C. I. & R. C....	.....	2		Alex. Wright....	Moncton.
13	McGregor, J. D.....	Port Hood.....	3			
4	Richey, M. H., et al.....	.....	1			
11	Ross, W. J.....	Broad Cove	1			
6	Ross, H. E., et al (<i>sea area</i>)	.....	1			
14, 15	Smyth, Peter.....	.....	2			
10	Tremaine, E. D., (<i>sea area</i>)	.....	1			
17	McDonald, Hugh.....	.....	1			
			16			
		RICHMOND CO.				
2	Victoria Oil and Mining Co.	Little River	1			
			1			
		VICTORIA CO.				
2	Kenny, T. E.....	New Campbellton	3			
3, 4, 5	Ross, William	Black Rock	5			
			8			
Total area under lease			245 $\frac{3}{4}$	square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	57,102	49,787	92,726	69,168	29,979	6,396	.....	.....	179,807	125,351
2nd Quarter	98,512	91,238	110,780	97,575	162,705	120,700	.....	.....	371,997	309,513
3rd Quarter	101,220	95,605	130,860	137,132	237,100	278,050	.....	.....	469,180	510,787
4th Quarter	112,089	103,905	98,453	92,125	118,694	112,829	.....	.....	329,236	308,859
Total	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884	279,946	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOR.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia																
Land Sales	24,431	37,704	19,507	98,093	65,658	2131	2305	5892	87	.....	.....	.....	124,829	109,254	21,725	255,808
Sea borne	1571	740	.....	33,380	10,066	.....	129,914	12,919	254	.....	.....	.....	164,865	23,725	254	188,844
Nova Scotia, total..	26,002	38,444	19,507	131,473	75,724	2131	132,219	18,811	341	.....	.....	.....	289,694	132,979	21,979	444,652
New Brunswick	37,616	22,362	32,892	25,573	1693	.....	28,163	335	.....	.....	.....	.....	91,352	24,390	32,892	148,634
Newfoundland .....	.....	.....	.....	4468	21	.....	69,123	710	.....	.....	.....	.....	73,591	731	.....	74,322
P. E. Island .....	.....	.....	.....	13,316	25,841	.....	10,988	2625	.....	.....	.....	.....	24,304	28,466	.....	52,770
Quebec	17,360	20,095	125,845	114,697	666	.....	151,166	16,348	47,740	.....	.....	.....	283,223	37,109	173,585	493,917
West Indies .....	.....	.....	.....	99	15	.....	5618	.....	.....	.....	.....	.....	5717	15	.....	5732
United States	412	.....	.....	283	.....	.....	9802	23,986	.....	.....	.....	.....	10,497	23,986	.....	34,483
Other Countries .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	.....	.....	.....	778,378	247,676	228,456	1,254,510
1884	155,999	102,406	.....	330,309	133,872	.....	459,210	79,845	.....	.....	.....	.....	945,518	316,132	.....	1,261,650
1883	152,453	69,894	.....	319,859	141,950	.....	543,419	69,195	.....	687	66	.....	1,016,418	281,105	.....	1,297,523
1882	151,281	67,068	.....	329,350	116,787	.....	522,325	63,245	.....	125	.....	.....	1,003,079	247,100	.....	1,250,179

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter	4th Quarter.	Year 1885.	Year 1884.
N. Scotia.						
Land Sales.	69,824	61,461	54,578	69,945	255,808	266,475
Sea borne..	6,720	43,706	91,998	46,420	188,844	226,575
N. Scotia—Tl	76,544	105,167	146,576	116,365	444,652	493,050
N. Brunswick	17,574	35,911	45,182	49,967	148,634	158,420
Newfoundl'd..	84	12,253	36,337	25,648	74,322	86,216
P. E. Island...		13,747	28,118	10,905	52,770	50,399
Quebec	30,738	135,446	233,764	93,969	493,917	396,782
West Indies..	245	675	774	4,038	5,732	9,595
United States	166	6,314	20,036	7,967	34,483	64,515
Other						
Conntries.....						2,673
Total....	125,351	309,513	510,787	308,859	1,254,510	1,261,650
1884..	138,303	307,915	486,601	328,821	1,261,650	1,297,523
1883..	141,994	325,153	498,913	331,463	1,297,523	1,250,179

COAL.—GENERAL STATEMENT.

1885.	Produce.	Sales.	Colliery Consumption.
1st Quarter	179,807	125,351	30,862
2nd Quarter	371,997	309,513	28,477
3rd Quarter	469,180	510,787	31,912
4th Quarter	331,221	308,859	36,373
Total.....	1,352,205	1,254,510	127,624
1884	1,389,295	1,261,650	116,769
1883	1,422,553	1,297,523	111,949
1882	1,365,811	1,250,179	111,381

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1885.

COLLIERIES.	SEAMS.	PRODUCE.	SALES.				COLLIERY CONSUMPTION.			
			Round.	Slack.	Run of Mine.	Total.	Per cent.	Engines.	Unknown.	Per cent.
CUMBERLAND Co.										
Chignecto	North	6,084	3,359	1,409		4,768	78	1,262	179	23
Joggins	Joggins	17,664	11,473	3,157		14,630	82	2,492	327	15
Milner		200	51			51	25			
Minudie		7,702	6,493	627		7,120	92	500	172	8
Patrick		485	383	102		485				
Springhill	North, Main and South.	335,055	58,171	75,375	178,244	311,790	93	16,057	3,360	5
Salt Springs		400	75	153		228	70	160	4	40
Scotia	North	1,318	1,270	78		1,348	100			
Lawson		115	115			115	100			
PICTOU Co.										
Acadia	Acadia	98,150	58,791	31,637		90,428	92	5,237	2,083	7
Albion	Third and McGregor.	129,195	74,395	37,535	2,131	114,061	88	11,847	4,196	12
Intercolonial	Acadia	109,139	75,435	22,442		97,887	89	6,412	2,690	8
New Glasgow *		200								
Vale	McBean and Six Feet.	96,135	76,288	12,346		93,634	92	12,464	1,542	14
CAPE BRETON Co.										
Barasois	Lingan	130	10			10	8			
Bridgeport	Phelan	13,178	11,953	630		12,583	95	63	33	7
Blockhouse	Blockhouse	11,075	7,316			7,316	66	2,000	710	25
Caledonia	Phelan	58,859	39,024	9,527		48,551	82	1,123	1,136	3
Franklyn	Sydney	759	136	623		759				
Glace Bay	Harbor	39,400	31,351	4,218	5,420	40,989		2,927	1,295	10
Gowrie	Gowrie	74,414	57,718	13,024	6,838	77,580		2,040	2,130	5
International	Harbor	(?)67,959	45,634	6,028	35,823	87,485		1,915	1,338	4
Lingan	Lingan	21,761	17,233	1,634		18,867	86	2,381	1,319	17
Ontario	Phelan	7,779	7,293	152		7,445	95	92	236	4
Reserve	Harbor	83,276	59,644	12,903		72,547	86	4,408	3,516	9
Sydney	Sydney	124,274	95,727	8,190		103,917	83	13,639	6,694	16
Victoria	Victoria	47,614	34,040	5,886		39,926	83	5,719	928	13
1,352,203			778,378	247,676	228,456	1,254,510		93,736	33,888	

* Further returns show 431 tons raised and 295 tons sold last quarter, 1885.

COLLIERY CONSTRUCTION ACCOUNT.—1885.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery.	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting.	Total.
CUMBERLAND COUNTY.											
Chignecto	\$275 00				\$750 00						\$ 1025 00
Joggins											
Lawrence		\$200 00	\$198 00				\$ 80 00	\$100 00			578 00
Milner		411 00	42 00	\$ 481 00		\$83 00	634 00		\$85 00	\$574 00	2310 00
Minudie											
Salt Springs		660 00	150 00	120 00			275 00				1245 00
Wm. Patrick	40 00			9000 00	3334 00		4845 00	360 00		2454 00	19993 00
Springhill											
PICTOU COUNTY.											
Acadia				3263 00							3263 00
Albion											
Intercolonial				1670 00	715 00						2385 00
Vale				3000 00		3000 00					6000 00
New Glasgow		500 00	500 00	800 00	75 00		150 00				2025 00
CAPE BRETON.											
Barrasois		899 00		1143 00							2042 00
Bridgeport	90 00		275 00	754 00	230 00	800 00	770 00	156 00			3075 00
Blockhouse											
Caledonia		1035 00	1141 00	1116 00				405 00	644 00		4341 00
Glace Bay			52 00	1067 00							1119 00
Gowrie			1416 00	3600 00							5016 00
International					896 00						896 00
Lingan			532 00								532 00
Ontario			152 00	15 00							167 00
Reserve	45 00	6240 00	64 00	371 00	776 00	1457 00	922 00				9875 00
Sydney				608 00							608 00
Victoria		438 00	7800 00	87 00	298 00	4070 00	82 00				12775 00
Total	\$450 00	\$10383 00	\$12322 00	\$27095 00	\$7074 00	\$9410 00	\$7758 00	\$1021 00	\$729 00	\$3028 00	\$79270 00

Statement of the Number and Classes of Men employed, and average results at each Colliery, during the year ended December 31, 1885.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.			TOTAL.		Average No. of tons, per Cutter.	Average tons per day, per Cutter.	Average quantity raised per day.	HORSES.		PITS WORKED.	
	LABORERS.		BOYS.		Skilled Laborers.	LABORERS.		Boys.	Days' Labor.	Persons.	Days' Labor.									
	Skilled Laborers.	Days' Labor.	Skilled Laborers.	Days' Labor.																
CUMBERLAND Co.																				
Chignecto	7	2	2	2,854	1	5	1	2,243						18	5,097	869	3	23	1	260
Joggins	34	7	7	7,603	8	23	7	7,976	2			108	88	15,687	518	4	104	2	126	
Minudie	18	7	3	5,476	5	5	2	2,907	1	1		260	42	8,643	427	1	32	1	234	
Salt Springs																				
Spring Hill	292	153	99	142,875	45	92	17	40,361	9	11	1	4,828	719	188,064	1,147	4	1,288	8	28	260
Patrick	2	1		729	1	1	1	735	1			200	7	1,664			1	1	1	287
Maccan	2			181						1		86	3	267	121			1		60
Scotia	3			405	1	1	1	174					6	579	439	3	9	1		132
Lawson	1	1	1	360	1		1	150					5	510	115			2		
Pictor Co.																				
Acadia	91	91	25	47,616	20	40	6	18,527					273	66,143	1,078	5	415	8	5	212
Albion	200	110	59	76,861	66	101	34	54,335					570	131,196	645	2	520	17	13	248
Intercolonial	126	50	61	53,495	31	56	9	26,057	2	1		574	336	80,126	866	4	532	7	15	205
Vale	217	81	16	74,993	50	104	6	40,986					474	115,979	350	1	338	3	11	225
New Glasgow	2	1	1	973	1			357	1			30	6	1,360						
CAPE BRETON Co.																				
Barasois		2	1	729		1		148		1		62	5	939						
Blockhouse	24	2	14	4,775	10	20	3	7,862					73	12,637	461	4	119	5	6	93
Bridgeport	17	1	4	4,399	2	2	1	1,451	3	3	1	858	35	6,708	775	6	116	1	1	113
Caledonia	70	5	18	15,561	12	20	10	9,623	15	1	4	3,358	155	28,542	840	5	392	6	13	150
Franchlyn	7	1	3	444	2	2	2	200					16	644				1		
Glace Bay	71	6	15	10,985	29	21	2	13,660					144	24,645	555	4	285	6	14	138
Gowrie	108	12	37	24,947	18	38	14	15,478					227	40,424	688	6	670	8	17	111
International	94	20	32	9,461	21	41	2	9,525					210	18,986	744	5	530	2	19	128
Lingan	48	4	13	11,709	2	21	10	8,191					98	19,900	453	2	128	3	8	169
Ontario	20	1	6	3,983	1	7	1	1,610					36	5,593	388	3	66	2	2	117
Reserve	116	12	33	31,529	14	22	8	10,162	5	3		2,425	213	44,116	717	5	616	8	12	135
Sydney	210	41	83	68,589	60	81	40	47,232					515	115,821	591	3	664	8	26	187
Victoria	83	23	7	28,967	8	42	5	16,407					168	45,374	573	1	159	4	3	298
INVERNESS Co.																				
Chimney Corner	2	1			1								4					1		
	1865	635	540	630,499	410	747	182	336,357	39	22	6	12,789	4,446	979,645	1,015	3	7,043	108	197	3,885

Nova Scotia Coal Sales, from 1785 to 1885 (inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670		1847	201,650	
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320	51,048	1851	153,499	1,533,798
1796	5,249		1852	189,076	
1797	6,039		1853	217,426	
1798	5,948		1854	234,312	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
			1857	294,198	
			1858	226,725	
			1859	270,293	
			1860	322,593	
1801	5,775	70,452	1861	326,429	2,399,829
1802	7,769		1862	395,637	
1803	6,601		1863	429,351	
1804	5,976		1864	576,935	
1805	10,130		1865	635,586	
1806	4,938		1866	558,520	
1807	5,119		1867	471,185	
1808	6,616		1868	453,624	
1809	8,919		1869	511,795	
1810	8,609		1870	568,277	
1811	8,516	91,527	1871	596,418	4,927,339
1812	9,570		1872	785,914	
1813	9,744		1873	881,106	
1814	9,866		1874	749,127	
1815	9,336		1875	706,795	
1816	8,619		1876	634,207	
1817	9,284		1877	697,065	
1818	7,920		1878	693,511	
1819	8,692		1879	688,628	
1820	9,980		1880	954,659	
1821	11,388	140,820	1881	1,035,014	7,377,428
1822	7,512		1882	1,250,179	
1823	27,000		1883	1,297,523	
1824			1884	1,261,650	
1825			1885	1,254,510	
1826					
1827	12,600				
1828	12,149				
1829	20,967				
1830	21,935				
1830	27,269				
		140,820			
1831	37,170	839,981		Total...	23,545,447
1832	50,396				
1833	64,743				
1834	50,813				
1835	56,434				
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198				

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 to 1800.....	51,048	1841 to 1850.....	1,533,798
1801 to 1810.....	70,452	1851 to 1860.....	2,399,829
1811 to 1820.....	91,527	1861 to 1870.....	4,927,339
1821 to 1830.....	140,820	1871 to 1880.....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1868	228,132	\$1 25
1851	116,274	"	1869	257,485	"
1852	87,542	"	1870	168,180	"
1853	120,764	"	1871	165,431	"
1854	139,125	Free	1872	154,092	75
1855	103,222	"	1873	264,760	"
1856	126,152	"	1874	138,335	"
1857	123,335	"	1875	89,746	"
1858	186,743	"	1876	71,634	"
1859	122,720	"	1877	118,216	"
1860	149,289	"	1878	88,495	"
1861	204,457	"	1879	51,641	"
1862	192,612	"	1880	123,423	"
1863	282,775	"	1881	113,728	"
1864	347,594	"	1882	99,302	"
1865	465,194	"	1883	102,755	"
1866	404,252	"	1884	64,515	"
1867	338,492	\$1 25	1885	34,483	"

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1885.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1885.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Quartz, etc., crushed.	Yield per Ton.		Maxim. Yield per Ton.		Total Yield of Gold.		Average yield per man per day for 12 months at \$18.00 per oz.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.		
Caribou	3	8355	2	1	1	2239	0	11	1	18	1335	14	11	2.87
Darr's Hill	1	31713	1	....	1	10880	0	9	1	10	4924	0	0	3.10
Fifteen Mile Stream	1	2479	2	....	2	898	0	9	0	17	424	15	6	3.08
Montagu	2	18908	1	1	....	2809	1	8	4	17	4001	6	2	3.80
Oldham	3	11777	1	....	1	1170	2	0	0	62	2360	12	5	3.60
Renfrew	2	5542	2	....	2	641	0	19	9	1	639	10	0	2.07
Sherbrooke	6	16050	2	1	1	2426	0	10	2	1	1238	11	0	1.38
Stormont	1	5891	1	1	....	707	1	4	0	1	863	15	10	2.63
Tangier	2	13729	2	2	....	874	0	9	9	0	431	9	14	0.56
Uniacke	2	4473	3	3	....	2010	0	5	7	1	576	0	12	2.31
Waverley	1	1135	1	1	....	223	0	15	2	1	170	2	6	2.68
Unproclaimed	5	38504	7	4	3	4013	1	6	1	12	5237	16	2	2.47
Total	29	157421	25	14	11	28890	0	15	4	62	22203	12	20	2.54

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.						DARR'S HILL.						FIFTEEN MILE STREAM.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	784	31	138	62	19	0	1	2290	91	900	189	0	0	1	18	...	74	34	10	0
February	2	845	34	...	..	..	..	1	2319	92	860	215	0	0	1	79	3	88	58	0	0
March	3	395	16	130	39	7	12	1	2500	100	960	260	0	0	2	204	8	56	24	0	0
April	2	622	25	78	35	2	12	1	2342	92	856	247	0	0	2	186	7	167	63	10	0
May	3	1192	47	373	177	2	0	1	2317	91	843	414	0	0	1	225	9	270	116	10	0
June	3	805	33	104	45	13	0	1	2619	104	875	356	0	0	2	200	8	...	...	..	..
July	4	1183	47	146	89	4	1	1	2450	98	965	304	0	0	2	466	18	10	8	10	0
August	4	659	26	257	183	18	14	1	2900	116	960	725	0	0	1	353	14	40	17	0	0
September	4	659	26	145	160	12	8	1	3294	131	954	277	0	0	1	245	10	60	35	0	0
October	2	605	24	271	43	19	13	1	2590	103	937	498	0	0	1	206	8	45	21	10	2
November	2	309	12	356	240	1	6	1	2875	115	865	919	0	0	1	129	5	45	23	13	1
December	2	297	12	241	157	14	17	1	3217	130	905	520	0	0	1	168	6	43	22	12	3
Totals	3	8355	...	2239	1335	14	11	1	31713	...	10880	4924	0	0	1	2479	...	393	424	15	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH	MONTAGU.							OLDHAM.							REDFEW.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	944	38	86	142	16	0	4	856	34	96	127	14	23	2	449	18	76	93	1	0
February ....	..	1030	41	123	212	5	0	4	1221	50	107	264	17	13	2	344	13	....	....	..	..
March .....	..	1014	41	171	351	16	0	5	1464	59	83	127	2	7	2	453	18	....	....	..	..
April	2	1167	46	60	148	8	0	3	1146	45	101	79	2	17	2	382	15	....	....	..	..
May	2	955	40	169	396	15	0	3	1226	50	119	111	9	14	2	485	19	56	98	15	0
June	2	2529	101	6	4	10	6	2	1139	45	156	124	9	16	2	393	16	135	165	19	0
July	2	1908	76	229	362	8	0	4	1123	45	100	330	16	17	1	416	16	....	....	..	..
August	1	1766	70	239	593	4	0	4	1139	45	46	298	17	0	1	581	23	....	....	..	..
September ..	1	2344	94	376	1384	5	0	3	1128	45	....	....	..	..	1	689	27	....	....	..	..
October	2	1980	77	459	164	16	5	2	495	18	123	508	0	16	2	493	20	17	3	7	0
November....	2	1725	69	451	135	17	15	2	390	16	123	127	17	2	2	415	16	120	98	0	0
December	2	1545	62	440	104	5	0	2	450	17	116	260	4	0	2	442	17	237	180	8	0
..	..	18908	....	2809	4001	6	2	3	11777	....	1170	2360	12	5	2	5542	....	641	639	10	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	SHERBROOKE.							STORMONT.							TANGIER.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	6	1809	72	211	162	2	0	2	792	31	75	175	19	0	2	1476	60	181	107	4	0
February	5	1440	58	171	117	15	0	2	853	34	69	146	6	0	2	1883	75	111	63	0	0
March	5	1430	57	122	88	15	0	1	602	24	50	77	12	0	2	1685	67	140	48	11	2
April	5	1456	58	130	90	10	0	2	622	25	60	89	18	0	2	939	39	13	6	3	0
May	6	1352	54	280	93	9	0	1	495	19	58	68	14	0	2	1120	45	41	17	17	12
June	7	1326	51	185	57	1	0	1	410	16	37	48	2	0	2	1448	59	....	....	..	..
July	10	1350	54	421	101	5	0	2	611	24	72	74	7	0	3	1460	59	....	....	..	..
August	9	910	36	112	30	3	0	1	322	13	58	63	4	0	2	386	15	....	....	..	..
September ..	6	1324	53	229	167	14	0	1	417	17	85	49	6	0	2	360	14	64	20	12	0
October	4	1080	43	136	120	0	0	2	327	13	27	13	5	10	2	1008	40	120	63	8	0
November....	5	1196	47	212	108	0	0	1	284	11	83	39	18	0	2	1053	40	74	63	11	0
December	4	1377	55	217	101	11	0	1	156	9	33	17	4	0	2	911	36	130	41	3	0
Totals	6	16050	....	2426	1238	11	0	1	5891	....	707	863	15	10	2	13729	....	874	431	9	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNIACKEE.							WAVERLY.							UNPROCLAIMED, ETC.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	198	8	54	9	15	0	..	....	....	....	....	..	..	3	2668	106	277	435	6	16
February	1	150	6	219	61	13	0	1	20	1	....	....	..	..	7	2465	98	132	71	3	15
March	1	100	4	52	21	3	0	1	60	2	4	6	9	0	9	3284	123	323	278	14	21
April	1	275	11	154	57	16	22	1	76	3	....	....	..	..	2	2166	86	466	259	0	0
May	2	295	12	98	26	19	0	1	68	3	8	6	9	0	4	2468	97	574	324	15	0
June	3	668	26	279	85	7	21	1	214	8	26	19	12	0	5	3068	123	417	356	4	18
July	3	575	23	245	78	0	0	1	148	6	20	19	4	0	7	3661	146	425	975	17	0
August	3	440	18	208	56	19	22	1	115	5	15	13	0	0	7	3830	152	404	783	4	0
September ..	3	552	22	205	65	14	21	1	247	10	109	83	0	6	7	3250	130	171	518	14	0
October	2	431	19	143	17	8	0	1	....	....	....	....	..	..	5	4133	165	369	595	13	4
November ..	3	382	15	179	40	9	7	1	....	....	41	22	8	0	4	3843	153	243	323	0	0
December	3	407	12	174	54	13	15	1	187	7	....	....	..	..	3	3668	143	212	316	3	0
Totals	2	4473	....	2010	576	0	12	1	1135	....	223	170	2	6	5	38504	...	4013	5237	16	2

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156,000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32161		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,689	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	51,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
Total.	389180	4	15	524813	.....			3,637,614	.....	.....

INTERCOLONIAL RAILWAY.

Statement showing the quantities, in tons, of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway, during the year 1885.

MONTHS.	ACADIA.	ALBION.			CHIGNECCTO.	DRUMMOND.	SPRING HILL.			VALE.	
		Round.	Small.	Coke.			Run of Mine.	Small.	Round.	Round.	Small.
January	2589	24	.....	.....	21	1421	.....	.....	6761	.....
February	5778	25	9	.....	.....	3089	20	12	2043	.....
March	3802	75	.....	18	.....	2987	.....	11	2424	.....
April	4459	37	.....	.....	16	6107	.....	.....	4347	.....
May	2525	158	.....	.....	.....	6558	.....	.....	3098	.....
June	1784	.....	12	.....	.....	9902	.....	.....	5213	.....
July	89	21	.....	.....	.....	.....	.....	4775	5225	.....
August	10	.....	.....	.....	.....	.....	6284	3553	.....
September	114	12	.....	.....	.....	.....	10048	5982	.....
October	150	.....	.....	.....	.....	.....	7541	6801	.....
November	15	.....	.....	.....	.....	80	6896	5317	.....
December	14	.....	.....	.....	57	7755	6470	11
Totals	91	21,026	629	47	18	37	30,064	157	43,322	57,234	11

MONCTON, N. B., January 28th, 1886.

INTERCOLONIAL RAILWAY.

STATEMENT, showing the number of tons of Coal received from Mines in Nova Scotia during the year ending the 31st December, 1885.

STATIONS.	No. TONS.	STATIONS.	No. TONS.
Halifax	40232	Moncton	13984
Bedford	454	Salisbury	1445
Windsor Junction	5138	Peticodiac	285
Wellington	98	Penobsquis	1036
Enfield	227	Sussex	558
Elmsdale	200	Apohaqui	18
Milford	77	Norton	28
Shubenacadie	283	Passekeag	14
Stewiacke	553	Hampton	650
Brookfield	89	Rothsay	138
Truro	6879	Coldbrook	4915
Valley	12	St. John	24203
Riversdale	10	Berry's Mills	22
West River	12	Weldford	24
Glengarry	18	Kent Junction	467
Hopewell	1230	Chatham Junction	334
Stellarton	47	Derby	36
New Glasgow	14093	Newcastle	69
Pictou Landing	48433	Bathurst	500
Belmont	58	Petite Roche	22
East Mines	72	Jacquet River	16
Londonderry	43275	New Mills	24
Wentworth	30	Charlo	6
Greenville	33	Dalhousie Junction	80
Thomson	18	Campbellton	146
Oxford	406	Little Metis	6
River Philip	6	St. Octave	6
Athol	6	Ste. Flavie	31
Maccan	45	St. Luce	4
Nappan	105	Rimouski	154
Amherst	3359	Trois Pistoles	19
Aulac	255	Riviere du Loup	59
Sackville	1868	St. Paschal	13
Dorchester	945	St. Charles	12
Memramcook	336	St. Henri	5508
Painsec Junction	6	Pointe Levis	15620
Shediac	264	Chaudiere (Local)	76054
Point du Chene	51	" (West of)	68609
			384338

From the following Stations :

STATIONS.	No. TONS.
Drummond	24260
Hopewell	1527
Stellarton	80514
New Glasgow	24960
Spring Hill	248903
Maccan	4174
Total	384338

19363 tons of Coke forwarded from Stellarton to Londonderry.

MONCTON, N. B., *January 28th, 1886.*

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

* GYPSUM.

Windsor	Tons.	60,628	Value.....	\$60,628
Cheverie	"	20,292	"	15,095
Walton	"	1,717	"	1,324
† St. Ann's, C. B.	"	2,790	" .....	....
Arichat (Lennox Passage)	"	2,000 ?	"	2,000
Halifax	"	217	"	1,839
† Walton	"	1,400	"	910

* BUILDING STONE.

Antigonish	Tons.	36	Value.....\$	144
Pictou	"	71	"	213
Wallace	"	3,720	"	17,592
		<u>3,827</u>		<u>\$17,949</u>

GRINDSTONES, ETC.

Lower Cove, A. Seaman & Co. }	Tons.	2,058	Value.....	\$28,812
* Parrsboro	"	150	"	150
		<u>2,208</u>		<u>\$28,962</u>

* MANGANESE.

Tenny Cape, Hants Co.	Tons.	100	Value.....\$	1,845
Windsor, "	"	26	" .....	....
Walton, "	"	27½	"	1,810
East Mountain, Colchester Co. ..	"	120	"	9,000
Loch Lomond, C. B.	"	20	" .....	....
Bridgeville, Pictou Co.	"	60	"	6,600
		<u>353½</u>		

Average number of men employed.....12

* ANTIMONY.

Rawdon	Tons.	758	Value.....	\$33,095
--------------	-------	-----	------------	----------

* Amounts exported.

† Barrels ground Plaster.

‡ Tons extracted, 3,000.

IRON MINING.

Londonderry	48,033 tons.
Bridgeville, Pictou Co.....	83 "
Annapolis	13 "
	<hr/>
	48,129

AVERAGE FORCE EMPLOYED DAILY.

Skilled workmen :

	No. of men.	Days Worked.
Under ground	79	21,661
Above ground	21	6,210

Unskilled workmen :

Under ground	28	7,732
Above ground	69	18,516

Total.....	197	54,119
------------	-----	--------

LIMESTONE (*Partial.*)

Pugwash.....	Tons.	215
St. Peter's	"	500
Londonderry (ankerite)	"	2,335
Brookfield*	"	13,379

BARYTES.

Henderson & Potts, } Brookfield. }	Tons.	300
---------------------------------------	-------	-----

Average force employed daily..... 3

* About 50,000 barrels of lime were burned in P. E. Island for agricultural purposes from Nova Scotia limestone.

EXPORTS FROM HALIFAX.

Products of the Mine year ending December 31st, 1885.

	Produce of Canada.		Not Produce of Canada.	
CoalTons.	22,713	\$ 72,532		
Gold . . . . .	....	397,902		
Gold Quartz . . . . .	....	150		
GypsumTons.	217	1,839		
Oils, MineralGals.	1,485	486	1,396	\$ 170
AntimonyTons.	758	33,095		
ManganeseTons.	22	1,399		
SaltBush.	....	....	29,652	6,129
		<hr/>		<hr/>
		\$507,403		\$6,299

FINANCIAL STATEMENT.—GOLD, &C.

Mines Department for twelve months ended 31st December, 1885.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Total.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Total.
Caribou	\$114 00	\$ 281 59	\$ 395 59	.....	.....	\$ 9 68	.....	\$ 9 68
Darr's Hill.....	.....	1473 12	1473 12	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	372 00	.....	372 00	.....	.....	.....	.....	.....
Gay's River	2 00	.....	2 00	.....	.....	.....	.....	.....
Lawrencetown	24 00	.....	24 00	.....	.....	.....	.....	.....
Montague	178 00	1416 72	1594 72	.....	.....	78 88	\$ 11 60	11 60
Oldham	220 00	795 68	1015 68	.....	.....	31 17	10 00	88 88
Ovens.....	18 00	2 25	20 25	\$ 2 00	.....	.....	40 00	71 17
Renfrew.....	52 00	209 90	261 90	.....	.....	10 51	.....	2 00
Sherbrooke	278 00	471 91	749 91	32 00	.....	24 03	32 00	42 51
Stormont	612 00	362 47	974 47	.....	.....	10 98	400 80	456 83
Tangier	16 00	302 92	318 92	.....	.....	12 76	37 00	47 98
Uniacke.....	.....	70 69	70 69	.....	.....	12 56	.....	12 76
Waverly	244 00	36 35	280 35	.....	.....	12 56	130 00	142 56
Wine Harbor.....	162 00	35 37	197 37	.....	\$ 19 64	90	.....	20 54
Unproclaimed	1362 00	1624 14	2986 14	24 00	.....	1 77	.....	1 77
Prospecting Licenses.....	.....	.....	4459 01	.....	184 84	63 48	315 57	587 89
	\$3654 00	\$7083 11	\$15196 12	\$58 00	\$204 48	\$256 72	.....	262 41*
							\$ 976 97	\$1758 58

*Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1885.

COUNTIES.	RECEIPTS.				EXPENDITURES.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'n Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	\$ 20 00	.....	.....	\$ 20 00	.....	.....	.....
Antigonish	120 00	\$ 50 00	.....	170 00	.....	.....	.....
Cape Breton	240 00	350 00	\$ 42118 42	42708 42	.....	\$ 946 70	\$ 946 70
Colchester	140 00	.....	.....	140 00	.....	.....	.....
Cumberland	240 00	250 00	26147 79	26637 79	.....	720 00	720 00
Digby	40 00	.....	.....	40 00	.....	.....	.....
Guysborough	60 00	.....	.....	60 00	.....	.....	.....
Halifax	20 00	.....	.....	20 00	.....	.....	.....
Hants	120 00	.....	.....	120 00	.....	.....	.....
Inverness	200 00	25 00	9 70	234 70	.....	.....	.....
Kings .....	.....	.....	.....	.....	.....	.....	.....
Pictou	560 00	.....	33135 34	33695 34	\$20 00	472 00	492 00
Richmond .....	.....	50 00	.....	50 00	20 00	.....	20 00
Victoria	40 00	25 00	.....	65 00	.....	.....	.....
Yarmouth	20 00	.....	.....	20 00	.....	.....	.....
Examinations .....	.....	.....	.....	52 00	.....	.....	217 92
Fines .....	.....	.....	.....	.....	.....	.....	36 67
	\$1820 00	\$750 00	\$ 101,411 25	\$ 104,033 25	\$40 00	\$2138 70	\$2433 29

ABSTRACT ACCOUNT.

Receipts and Expenditure for the twelve months ended 31st December, 1885.

RECEIPTS.		EXPENDITURE.	
Licenses to Search.....	\$ 182,000 00	Return Licenses to Search.....	\$ 40 00
" Work	750 00	Salaries and Surveys.....	2138 70
Royalty	101,411 25	Fines	36 67
Examinations	52 00	Examinations	217 92
	<u>\$104,033 25</u>		<u>\$ 2433 29</u>
Rents	\$ 3654 00	Return Rents.....	\$ 58 00
Royalty	7083 11	" Royalty	204 48
Prospecting Licenses.....	14459 01	Royalty Commission.....	256 72
	<u>\$ 15196 12</u>	Salaries and Surveys.....	976 97
		Return Prospecting Licenses.....	262 41
			<u>\$ 1758 58</u>
		General Expenses.....	\$4906 08
		Postage	131 00
		Stationery and Printing.....	930 18
			<u>\$ 5967 26</u>
			<u>\$10159 13</u>
	<u>\$ 119,229 37</u>		

REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1886.



HALIFAX, N. S.
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.
1887.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1886.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obed't servant,

CHARLES E. CHURCH,

Commissioner of Public Works and Mines.

HALIFAX, March 2nd, 1887.

REPORT

ON THE

MINES OF NOVA SCOTIA.

BY EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(Member of the American Institute of Mining Engineers, etc.)

OFFICE OF INSPECTOR OF MINES,
HALIFAX, March 1st, 1887.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines and Minerals of Nova Scotia, and the progress of mining, during the year 1886.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1886, compared with that of the previous year :

		1885.	1886.
Gold.....	Ounces....	22,203	23,362
Iron Ore.....	Tons.....	48,129	44,388
Manganese Ore.....	"	353½	427
Barytes	"	300	230
*Antimony.....	"	758	645
Coal raised.....	"	1,352,205	1,502,611
*Gypsum	"	87,644	123,753
Building Stone.....	" ...	3,827	8,000
Coke made	"	30,185	31,604
Limestone.....	"	16,429	20,265
Grindstones, etc	"	2,208	1,600
*Moulding Sand.....	" .....	.....	200

* Amount exported.

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further information under this head at the end of the report.

I also beg to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton. These gentlemen have paid regular visits to the mines in their respective districts, and report that generally every attention is paid to the observance of the Mines Regulation Act.

Their reports this year contain some interesting statistics of the pumps used for freeing our coal mines from water, the dimensions of the pumps, supply of steam, burden, and total amounts pumped being given in tabular form.

During the year 1885-6 the working of our coal mines was continued steadily, and presents few new features of interest. The discovery of gold bearing veins in the counties of Lunenburg, Queens, and Yarmouth, has led to the opening of several promising mines, at Whiteburn, Brookfield, Carlton, etc., and it is confidently expected that the year 1887 will see a number of equally valuable finds.

I regret that I am unable to chronicle any further advance in the development of our most important resource, the iron ore deposits. The works at Londonderry have continued as usual, and it is expected that before long a renewed impetus will be given to their operations which are closely allied to the chief source of our mineral revenue.

In accordance with arrangements entered into between Sir Charles Tupper, chairman of the Canadian Commission for the Colonial and Indian Exhibition, and your honorable Government, it was agreed that as complete an exhibit as possible of the mineral productions of this Province should be forwarded to the Exhibition, and shown *en bloc* as part of the Canadian mineral exhibit. The names of all parties desiring to exhibit in this manner through the Government of Nova Scotia were to be attached to their specimens, and they retained all rights and privileges of ordinary exhibitors.

As the understanding was arrived at near the close of the year 1885, and an early date was fixed for the shipment of specimens, the Provincial collection was not nearly as complete as could be desired. At least twelve months are required for the proper collection of a systematic set of the economic minerals of Nova Scotia. The collection was made with all possible speed, and reached the Exhibition safely, and was much admired by mining men and others connected with metallurgy, etc.

As usual, a generous assistance was given by the various coal companies, and large and handsome specimens were secured. The following list from the official catalogue will give an idea of the extent of the Provincial Exhibit:—

- General Mining Association, Sydney Mines—1 block Coal, 1200 lbs.
 Low Point, Barasoi's, and Lingan Mining Co., Cape Breton—1 block of Coal, 1000 lbs., from Low Point Mine. 1 block of Coal, 1000 lbs., from Lingan Mine.
 International Coal Mining Co., Bridgeport, Cape Breton—1 block of Coal, 1000 lbs.
 Sydney & Louisburg Coal and Railroad Co., Reserve Mines, Cape Breton—1 block of Coal, 400 lbs.; sample of Coke, 200 lbs.
 Glace Bay Mining Co., Glace Bay, Cape Breton—1 block of Coal, 300 lbs.
 Gowrie Coal Mining Co.—1 block Coal, 400 lbs.; sample Patent Fuel; Coal Fossils.
 Old Bridgeport Mines, Cape Breton—1 Block of Coal, 300 lbs.
 Cumberland Railway and Coal Co., Springhill, Cumberland County—1 column of Coal, 11 feet high; 1 block of Coal, 200 lbs.; sample of Nut Coal, 120 lbs.; 1 block of Coal, 900 lbs.
 Joggins Coal Mining Co., Cumberland County—1 column of Coal, 1000 lbs.
 Halifax Company, limited, Albion Mines, Pictou County—sample of Coke; 1 block "McGregor Coal; Sample "McGregor" Nut Coal; Sample "Third Seam" Coal—900 lbs.
 Vale Coal Co., New Glasgow, Pictou County—sample of "McBean" Coal, 250 lbs.; sample of "six feet" Coal, 250 lbs.
 Acadia Coal Co., Stellarton, Pictou County—sample Acadia Coal, large, 250 lbs.; sample Acadia Coal, Nut, 250 lbs.
 Intercolonial Coal Mining Co., Westville, Pictou County—sample of Acadia Coal, large, 250 lbs.; sample Acadia Coal, Nut, 250 lbs.
 R. H. Brown, Sydney Mines, Cape Breton—Coal Fossils.
 J. H. Bartlett, Springville, Pictou County—Spathic Iron Ore, 200 lbs.; Specular Iron Ore, 200 lbs.; Limonite Iron Ore, 200 lbs.; Red Hematite Iron Ore, 200 lbs.; Red Hematite Iron Ore, 200 lbs.
 The Government of Nova Scotia—Red Hematite, 150 lbs., Stewiacke, Colchester County.
 Chas. Kenny, Salmon River, Guysboro County—Specular Iron Ore, 200 lbs.
 Thomas Callahan, Manchester, Guysboro County—Specular Iron Ore, 200 lbs.
 A. Cumming, Melrose, Guysboro County—Specular Iron Ore.
 E. T. Moseley, Sydney, Cape Breton—Red Hematite.
 Government of Nova Scotia—Chilled Iron, Londonderry Mines, Colchester County; Bog Iron Ore, Liverpool, Queen's County.
 D. McLaughlin, Shubenacadie — Argentiferous Galena, Smithfield, Colchester County; Marble, 100 lbs., Marble Mtn., Cape Breton; Marble, 100 lbs. Marble Mtn., Cape Breton; Lime from above. Gypsum Rock, Shubenacadie, Hants County; Plaster made from above.
 E. W. Dimock, Windsor, Hants County—Gypsum, 200 lbs., Windsor.

STEEL COMPANY OF CANADA.

Londonderry, Colchester Co.—Rolled Axle Blank, prepared for the hammer, made from puddled iron, squeezed in rotary squeezer and rolled into puddled bar, 5 in. wide, $\frac{11}{16}$ in. thick and 4 in. wide, $\frac{11}{16}$ thick. Piled—9 in. wide, 10 tiers high. Heated in re-heating furnace on a sand bottom, rolled in an 18 in. train, and subject to the following tests:—

Four blows at 9 feet and two blows at 11 feet of a 2000 lbs. weight, striking midway between solid iron supports placed 3 feet apart. Blank turned over after each blow. The deflection after each blow was found to be as follows:—

1 st blow,	deflection	$1\frac{5}{8}$,	drop of	9 feet,	weight	2000 lbs.
2nd	"	$2\frac{3}{8}$,	"	"	"	"
3rd	"	$2\frac{1}{8}$,	"	"	"	"
4th	"	$2\frac{7}{16}$,	"	"	"	"
5th	"	$2\frac{5}{8}$,	"	"	"	"
6th	"	$2\frac{5}{8}$,	"	"	"	"
7th	"	$4\frac{1}{2}$,	"	"	"	"

Taken thence to hydraulic press and bent until the ends came into contact, without showing the least fracture, weighing about 300 lbs.

1 Puddled Ball, weighing about 165 lbs.

1 Puddled Bloom " " 205 lbs.

SAMPLES BAR IRON.

1 Piece	$2\frac{1}{4}$	inches square,	Sieman's iron.
1 "	$3 \times 1\frac{1}{4}$	"	"
1 "	$\frac{5}{8} \times \frac{11}{8}$	"	"
1 "	$\frac{7}{8}$	"	round, "
1 "	$\frac{1}{2}$	"	" " tied in a knot.
1 "	$\frac{1}{4}$	"	" " "
1 "	$1 \times \frac{7}{16}$	"	Sieman's Horse Shoe iron.
1 "	$\frac{7}{8} \times \frac{1}{2}$	"	" " "
2 "	$3 \times 1\frac{1}{16}$	"	Muck Bar, weighing about 150 lbs.
1 "	6×1	"	Siemen's iron.
1 "	4×1	"	"
1 "	$1 \times \frac{7}{8}$	"	"
1 "	$3 \times 1\frac{1}{4}$	"	"
1 "	$\frac{3}{4}$	"	round, "
1 "	1	"	" " "
1 "	$1\frac{1}{4}$	"	square, Siemen's Best iron.
1 "	$1\frac{1}{8}$	"	" " "
2 "	$1\frac{1}{4} \times 1\frac{3}{8}$	"	Siemen's Link iron for cars, weighing about 150 lbs.

The latter stood the following tests, viz.:—

Ultimate tensil strength, 53,947 lbs. per square inch.

Reduction at point of fracture, 31 per cent.

Elongation in 12 inch diameters, 26 "

1 Link $1\frac{1}{4} \times 1\frac{3}{8}$, ready for use.

1 Piece $1\frac{1}{4} \times 1\frac{3}{8}$, Siemen's Link iron, cold bent.

1 Piece Brown Hematite Ore from West Mine, weighing about 5000 lbs.

2 Pieces Specular Ore and 2 pieces Red Hematite Ore, East Mine, weighing about 2000 lbs.

3 Pieces Spathic Ore, from West Mine, weighing about 2000 lbs.

2 Pieces Brookfield Limestone.

2 " West Mine "

1 " Ankerite.

1 Boulder "

The latter occuring in the Brown Hematite—weighing in all about 900 lbs.

1 Piece Totten Ore, from East Mine, being a mixture of Ankertite, Spathic and Hematite Ore, weighing about 800 lbs.

1 Piece Brown Hematite, from West Mine, weighing about 2000 lbs.

1 Bar No. 1 Pig Iron.

1 " " 2 "

1 " " 3 "

1 " " 4 "

1 " Car Wheel iron, weighing about 500 lbs.

ANALYSIS OF ORES, ETC.

	Brown Ore.	Totten Ore.	Specular Ore.
Insoluble Matter.....	15.97	1.95	0.58
Ferric Oxide	67.04	13.82	99.39
Ferrous Oxide.....	....	4.26	0.82
Alumina.....	3.62	1.13	
Maganese.....	....	0.86	
Maganic Dioxide.....	1.90	....
Lime	0.41	33.31	
Magnesia	0.18	6.09	
Carbonic Anhydride.....	....	34.77	
Water of Hydration.....	10.17	3.20	Trace.
	<hr/> 99.29	<hr/> 99.39	<hr/> 100.29
Metallic Iron.....	46.93	12.98	69.81
	Spathic Ore.	Ankerite.	
Insoluble Matter.....	....	0.19	
Calcic Carbonate.....	1.92	54.96	
Ferrous Carbonate	68.15	21.92	
Maganous Carbonate	1.87	1.29	

	Spathic Ore.	Ankerite.
Magnesian Carbonate.....	28.16	21.42
Ferric Oxide .....	.....	1.05
	<hr/>	<hr/>
	100.00	100.83

Limestone (Bookfield.)

Silica	Trace
Lime.....	54.54
Oxide Iron and Alumina.....	2.70
Magnesia .....	.94
Carbonic Acid	42.85
	<hr/>
	101.03

- G. Clough, Lennox Passage, Cape Breton—Gypsum, 50 lbs.
Government of Nova Scotia—Polished Gypsum, Windsor, Hants County. Concretionary Limestone, New Glasgow, Pictou County.
Two samples Polished Marble, Cape Breton.
- E. T. Moseley, Sydney, Cape Breton—Pyrolusite, Loch Lomond, Cape Breton County.
- J. W. Stephens, Tenny Cape, Hants County—Two samples Manganese Ore, 200 lbs., Tenny Cape, Hants County.
- Alexander Carter, Truro, Colchester County—Sample Manganese Ore, 100 lbs.
- J. Browne, Spring Hill, Pictou County—Sample Manganese Ore, 35 lbs.
- Henderson & Potts, Halifax, N. S.—Sample Barites, 100 lbs.; Sample Paint.
- Coxheath Copper Mining Company, Sydney, Cape Breton—Copper Pyrites, 200 lbs; Copper Matte; Iron Ore, Flux.
Limestone, Flux; Slag from Copper Ore; Assays, Charts, Photos, etc.
- L. Johnstone, Stellarton, Pictou County—Copper Ore—Ohio, Antigonish County.
- Government of Nova Scotia—Copper Ore—Polson's Lake, Guysboro' County.
- H. S. Poole, Stellarton, Pictou County—Cabinet Iron Ores.
- R. P. Fraser, Pictou, N. S.—Copper Ore—College Lake, Antigonish County.
- M. F. Eagar, Halifax, N. S.—Cabinet Nova Scotia Minerals.
- J. M. Ruggles, Lockeport—Cabinet Nova Scotia Minerals.
- B. M. Davidson, Rawdon, Hants County—Block Antimony Ore, 1000 lbs.
- Scotia Mining Company, Sydney, Cape Breton—Mica.
- J. Grant, Halifax, N. S.—Samples Magnetite, Copper, and Lead Ores.
- C. B. Whidden, Antigonish—Sandstone; Limestone.
- Government of Nova Scotia—Mineral Map of Nova Scotia, 12 ft. by 4 ft.
- Government of Nova Scotia—Obelisk showing gold taken from Nova Scotia Mines since 1862.
- Government of Nova Scotia—Sample Auriferous Quartz. Montague Halifax County.

Albion Gold Mining Company—Sample Auriferous Quartz.
F. W. Christie, Bedford, Halifax County—Auriferous Alluvium, 1 cubic foot—Ovens, Lunenburg County.
A. A. Hayward, Renfrew, Hants County—Samples Auriferous Quartz.
Dufferin Gold Mining Company, Salmon River, Halifax County—Sample Auriferous Quartz.
Kemptonville Gold Mining Company, Yarmouth N. S.—Auriferous Quartz.
Rhodes, Curry & Co., Amherst, Cumberland County—Sandstone—Amherst.

Had time allowed a much better collection of building stones, clays, ochres, slates, etc., etc., could have been gathered.

I venture to draw your attention to that part of the Mines and Minerals Act relating to the granting of Prospecting Licenses for Gold. These licenses are granted for six months, with an option of renewal. Their location and renewal has led to much confusion and trouble in new districts, as they are frequently selected almost at random for speculative purposes, and mistakes arise when portions of them are selected for leasing, etc. In view also of the large extent of ground covered by leases which are practically unforfeitable, the following suggestion may be worth consideration. This is briefly that the system of granting prospecting licenses be abolished, that leases be issued for any term decided on say 20 or 30 years to be held by labor or annual rental. That on the non-performance of the labor or non-payment of the rental the lease be thereby forfeited without recourse to any court of investigation or forfeiture. To give an opportunity to those who may be desirous of prospecting, the cost of the lease for the first year could be made the same as that of a prospecting license of equal extent, but if the lessee desired to continue his operations he should then before the close of the first year secure the continuation of the lease for another year by payment of the permanent rental, and so on. An arrangement similar to this would on the basis of a small annual rental of say \$1.00 an area prove a boon to the prospector, for under the present arrangement he would pay for a prospecting license of one area for 12 months, 75 cents, then for a lease \$2.00 in all \$2.75. This secures him the ground for say two years; if he did not work his lease would be liable to forfeiture. Under the proposed arrangement the same sum would secure to him his area for three years. This arrangement would also give the Province a revenue from the numerous unworked leases now hindering exploration and probable discovery of valuable ground in all our mining districts, stimulate the holders to work, and give a security and fixity of title to leases which is desirable in the interests of investors. Provision could be made to protect properties on which any temporary cessation of work was necessary, or which were in litigation, and to prevent injustice to any prior occupant who had made any bonafide expenditure.

COAL TRADE.

The total sales for the year 1886 amounted to 1,373,666 tons, made up of 789,006 tons of round, 305,322 tons of run of mine, and 279,338 tons of slack coal, as compared with 1,254,510 tons sold during the year 1885.

The following are the most noticeable points in the coal trade.

The home sales were 460,237 tons compared with 444,652 tons in 1885 and 493,050 tons in 1884.

The Province of Quebec took 538,762 tons, against 493,917 tons in 1885, and 396,782 tons in 1884.

The sales to New Brunswick were 175,918 tons compared with 148,634 tons in 1885.

Newfoundland took 71,476 tons, against 74,322 tons in 1885.

The sales to Prince Edward Island were 49,168 tons against 52,770 tons during the preceding year.

The West Indian sales were 16,721 tons compared with 5,732 tons in 1885.

The sales to the United States comprise 22,127 tons of round 35,479 tons of slack, and, 3,040 tons of run of mine coal, compared with 10,497 of round and 23,986 of slack during the previous year.

The increased sales to the United States were largely due to the strike among the coal mines in the spring. Had the strike taken place a few weeks later very large amounts would have been shipped, but the opening of navigation was retarded by drift ice, and the coal sent forward went in the early part of the second quarter, the total shipments to the end of that quarter being 38,697 tons.

CUMBERLAND COUNTY.

The total sales of this county amounted to 416,266 tons, against 340,535 tons in 1885, and 258,405 tons in 1884.

The home sales were 103,886 tons against 83,953 tons in 1885.

The sales to New Brunswick were 118,088 tons, compared with 92,872 tons during the preceding year.

The Province of Quebec took 188,935 tons, as compared with 163,303 tons in 1885.

COLLIERIES.

Chignecto.—During the past year a few men have been employed in getting a small amount of coal, and in keeping the pit in order. The roof and upper portion of this seam at this mine, as well as at the Scotia colliery, contains a good deal of pyrites and clay, which gradually heats and takes fire if water finds access to it. These smouldering fires have given much trouble along the crop working in this seam, but hitherto the deeper workings of the Chignecto mine have been free from them. Last fall however it was found necessary to build off some of the bords in No. 4 Balance, as there were plain signs of heating. Arrangements have been made to keep both air and water from passing into the heated bords, and it is anticipated that no serious results will ensue.

Joggins.—Work has been continued as usual during the year, and the levels have been extended to the faults. The output was 22,243, against 17,664 tons in 1885.

A little work has been done at the Minudie, Milner & Lawson mines.

At the Patrick mine, near Maccan, some prospecting work during the summer showed the outcrop of a seam of coal said to contain six feet of coal with a shaley coal parting, the bottom bench two feet thick being a canneloid coal, and apparently well adapted for gas. The coal is of excellent quality, as appears from the following analysis:

Moisture.....	1.00
Volatile Combustible Matter	55.61
Fixed Carbon.....	35.90
Ash.....	7.00

100.00

Sulphur..... .50 .

and the work of preparing the mine for regular mining was continued.

At the Styles mine the slope is now down 130 feet in the dip, which is about 44°. The seam contains 4 feet 2 inches of coal, with two bands of shale.

Springhill.—The Cumberland Railway and Coal Company have greatly enlarged their operations during the past year. The output was 416,769 tons, compared with 335,055 tons in 1885.

The Barlow seam as opened by a trial pit proved to be eleven feet thick. Arrangements are being continued to put the syndicate slope in a position for a regular output. The deepening of the East Slope will open a large field of excellent coal.

The negotiations for the construction of a railway from the Intercolonial railway at Maccan to the Joggins mines have been followed by an active construction. The road crosses the Maccan River near the highway bridge, and from this point to the Joggins shore it follows closely the outcrop of the band of strata which carry the coal seams. Its completion will give ample facilities for an all winter outlet via Maccan, and presumably shipping accommodation will be provided where the line touches deep water.

PICTOU COUNTY.

The total sales were 369,026 tons, against 396,000 tons in 1885.

The home sales were 202,516 tons, against 209,428 tons in the preceding year.

The Province of Quebec took 95,499 tons compared with 145,363 tons in the year 1885.

The sales to Newfoundland, Prince Edward Island and New Brunswick present no new features of interest.

COLLIERIES.

Acadia Coal Company.—The company bearing the name of the Acadia Coal Company, formerly working the colliery known by that name, now includes, pursuant to an amalgamation effected last year, the Collieries of the Halifax Company, commonly known as the Albion Mines, and those of the Vale Coal, Iron and Manufacturing Company. The present Acadia Company has now five large Collieries in running order and controls the areas formerly held by the companies referred to above. Mr. H. S. Poole continues as Agent for the Consolidated Company, and his new work will doubtless be marked by the success which has attended his management of the old Acadia Colliery. It is to be anticipated that by a concentration of shops, stores, offices, etc., etc., a perceptible reduction will be effected in the cost of the coal.

Acadia—Work has been carried on steadily during the past year, and the extraction of coal in the new lift systematically pursued. The output was 98,891 tons, compared with 98,150 tons in 1885.

Albion.—The McGregor mine was not worked during the year, but it has been kept in order and ventilated. The slopes have been continued, and the levels extended. At the Foord pit a good deal of

pumping has been done and the water level lowered considerably. The pumping has been done in the main hoisting shaft by means of two self-filling and self-discharging iron tanks, raised by the winding engine. These tanks are 8 ft., 6 in., by 6 ft., 3 in., by 3 ft., and the engine makes 40 trips each hour. The amount of water thus raised during the year is given by Mr. Madden at 873,800 gals. per day of 22 hours, and at no less than 1,599,758 tons for the whole year. The output of the Colliery was 77,807 tons, compared with 129,195 tons during the preceding year.

Vale.—The explorations in the McBean seam at the 1800 feet level on the east side of the fault have shown good and regular coal, and it is proposed to open it out to the rise. The new 2,400 feet level is working regularly, and the coal continues of good quality. In the six feet seam the workings have been regularly extended and improvements effected in the ventilation. The output of the colliery was 128,539 tons, compared with 96,135 tons in 1885.

Intercolonial.—At this mine work has been confined to the main slopes, the No. 4 slope and the second seam shaft remaining unworked. There are few new points of interest in the operations conducted here. A steam jet has been introduced for the purpose of maintaining ventilation should any accident happen to the fan. The coal raised amounted to 108,498 tons, compared with 109,139 tons during the preceding year.

Messrs. Grant & Muir worked during part of the year on a small seam of coal at Coal Brook, on the Montreal and New Glasgow area, and in the fall removed to the east end of the East River area, where arrangements were made for opening one of the seams of the marsh group.

CAPE BRETON COUNTY.

The total sales from Cape Breton County during the year 1886, were 588,191 tons, compared with 517,975 tons during the year 1885 and 539,064 tons during 1884.

The home sales were 153,652 tons, against 151,371 tons in 1885.

New Brunswick took 26,284 tons, compared with 28,498 tons during the preceding year.

The sales to Newfoundland were 71,018 tons, against 69,833 tons during the year 1885.

Prince Edward Island took 14,201 tons, against 13,613 tons in the year previous.

The sales to Quebec show 254,328 tons, against 215,254 tons during the year 1885.

The sales to the West Indies amounted to 11,364 tons, compared with 5,618 tons during the preceding year.

The trade with the United States was 56,606 tons, compared with 33,788 tons in 1885, and 62,565 tons in 1884.

COLLIERIES.

Sydney—The seaward extension of the workings has been steadily continued. The Francklyn Lease lying under the harbor has been worked to some extent through this mine. The greater part of the water with which the fire of last spring was drowned out, has been removed. The cause of the fire has never been positively determined, but it has been suggested that it was caused by sparks from a lamp falling among some dry timber. Mr. Neville gives some further information about the arrangements made concerning this district of the mine. The output was 139,646 tons, compared with 124,274 tons in 1885.

Victoria—Work has been continued steadily at this mine. The fault on the east side which was a flat lying upthrow going east was pierced. The slopes are being extended, and the lower sections are dryer than those first opened. The output was 50,156 tons, compared with 47,614 tons in 1885.

Lingan—In the fall, work was discontinued in this mine, and the plant removed. The old port of Lingan, is not adapted to the present requirements of the coal trade, as it is too shallow for steamers and large sailing vessels. It is proposed to re-open the seam some distance to the north and to ship over the Low Point Railway. The output was 17,688 tons, against 21,761 tons in 1885.

Reserve.—Work was carried on steadily during the past season, the output being 81,783, compared with 82,276 tons during the preceding year. The slope to the Emery seam is about 250 yards long and dips at the rate of one foot in four. The Emery seam as cut by it is of good quality, and from 4 ft. 9 in. to 5 ft. in thickness. A stapple has been sunk between the seams and connections made for ventilation.

International—The output at this mine was 118,129 tons, against 67,959 tons in 1885. Workings have been continued in the upper level and some pillars drawn. The No. 4 landings have been continued, and the new deep workings opened out. An underground engine, friction geared, with two nine inch cylinders, geared three to one, has been set to haul along the upper level. A Riggs patent screen and tippler has been erected, and found to give every satisfaction.

Bridgeport—Mr. Mitchell continued working, and has completed an air shaft 40 ft deep, and a reservoir, and made further improvements above ground. The output was 14,344 tons, against 13,178 tons during the preceding year.

Little Glace Bay.—The working places have been extended during the summer on the system in force since the opening of the pit. A new boiler stack and foundations have been built, and the boilers removed to the rear of the winding engine. The output was 33,382 tons, compared with 39,400 tons in 1885.

Caledonia.—The deeps have been continued and fresh rooms won out, the greater part of last season's coal having been taken from them. The coal in this section is of excellent quality, but as a little gas is given off, caution is required in working. The output was 72,810, compared with 58,859 tons in 1885.

Ontario.—A little work was done in the upper portions of the mine, no attempt having been made to reach below the water level.

Block House.—No work of any moment was done here during 1886. In the summer the goods and chattels of the mine were seized by the sheriff and sold for arrears of royalty.

Gowrie.—The dip slants have been continued and are 300 yards in length, levels have been driven east and west and rooms turned away. The coal is of good quality, and from five to five and a half feet thick. The coal is raised to the pit bottom by a surface engine having a pair of 6 in. cylinders, electric signals being used. Work has been continued at the Briquette factory, and the fuel is steadily finding favor for steam and domestic purposes. The output was 93,307 tons, compared with 74,414 tons during the preceding year.

MISCELLANEOUS.

A few tons of coal were mined at Broad Cove and Chimney Corner in Inverness County.

A seam of coal said to be eight feet thick and of workable quality is said to have been found to the west of the Gowrie Leases at Cow Bay.

Discoveries of coal were reported from Onslow and Lower Stewiacke in Colchester County; from Oxford, and Advocate Harbor, Cumberland County; and Selma, in Hants County.

GOLD.

The returns show that 128,880 days' labor were performed, and that 29,010 tons of quartz were crushed, yielding 23,362 ounces, 5 dwts., an average of 16 dwts. per ton, the maximum yield being 17 oz., 10 dwts., per ton, and minimum 5 dwts.

The yield of gold is slightly larger than during the previous year, but the increase is smaller than it should be. Many of the older districts fell off largely in their production; notably Montague, Stormont, Uniacke; and the larger output of the "unproclaimed and other districts" little more than made up the deficiency.

DISTRICTS.

CARIBOU.—The returns for 1886 show 2,233 ounces, compared with 1,335 ounces in 1885. On the property of the Moose River Company a good deal of work was done by tributors on the Little North and Copper leads. Bruce did some prospecting on the Taylor and Archibald properties, working in the latter two small rich leads.

Mr. Touquoy worked several leads, among which may be mentioned the North, Little North, and Copper Lead. On the first, last year's operations were continued. The South lead was opened by him for about 60 feet, this vein forms a saddle dipping west. On the Copper lead a new shaft was sunk, and about 70 feet opened.

In Caribou, Mr. Bruce worked in Lease No. 79, on the North Lead No. 1 of Mr. Touquoy, and the Lake lead was worked by Mr. Wadsworth for some American capitalists. The lead passing abruptly across the metals for some distance, resumed its normal course, widening to several feet and yielding rich quartz.

DARR'S HILL.—The Dufferin Gold Mining Company has proved the most permanent of the gold mining corporations of the Province. During the past year the returns show that 11,628 tons of quartz yielded 6,509 ounces, being a total to date of 24,556 ounces from 44,881 tons of quartz. During the past season their works have been pushed to the east, the quartz measuring from four to twelve feet in thickness. A dam has been built across the river about one half mile above the crusher dam, and power obtained to do all the pumping, hoisting, etc., by an endless wire rope, connected with friction gear, etc., at each shaft.

FIFTEEN MILE STREAM.—Mr. Hudson has continued working his areas, but the resumption of work on the property generally known

as the Hall-Anderson did not take place. Mr. Grant and others did some prospecting, and Mr. Walton began to test some promising leads at Caledonia.

MONTAGUE.—Work on the Albion areas was stopped entirely in the spring, and the district was idle until the fall, when Mr. Hale re-opened the main lead on the Symond's property to the east of the mill; the vein promises well, and work will be continued.

OLDHAM.—Mining business has revived to some extent in this district and is in a very encouraging condition. J. E. Hardman has been sinking and drifting on the "Dunbrack" lode and has obtained some rich quartz.

E. C. McDonnell has been working the property adjoining J. E. Hardman on the "Dunbrack" lode. The lode increased in value in depth, and the returns from the quartz in the bottom was 3 oz. per ton. Mr. McDonnell intends to move his engine, hoist and pump to the 310 feet shaft and push the work forward vigorously during the coming season.

Donaldson Bros., have been working a property on the same lode and are now down 95 ft. in the main shaft. The lode has improved in value, in depth. They propose to put up appliances to carry the shaft deeper during the coming season.

RENFREW.—In the spring some ground was worked by Mr. Hayward, and attention was turned to deepening the shaft, which is now 300 feet deep. A large amount of ore has been blocked out, and it is expected will occupy the mill for several months.

SHERBROOKE.—The total returns from this district were 1,341 oz. from 2,850 tons; the smallest being 63 ounces in May, and the highest 278 ounces in March. During the season Mr. Williams worked on the New York property, re-opening the Old German pit, the lead showing from 4 to 10 inches, at the shaft bottom 180 feet deep. Several leads were opened and tested on the Wellington area. On the Pactolus stopes were carried eastward from the great open cut into the Meridian property. Work was done by Messrs. Foley, May, and others at several points, but I regret to say that mining is still dull in Goldenville.

At Cochran's Hill a little work was done on the Cumminger property by Mr. Caffrey; and Mr. R. P. Fraser continued the development of the Crow's Nest mine, where several promising leads were worked, and low grade ground tested.

STORMONT.—Operations have been partially suspended in this district. Tribute work has been carried on by Mr. Hewitt and others at various points. At the Narrows of Country Harbor a good deal of prospecting has been done on Johnson's Brook. Several promising leads have been found, especially on the properties of the Messrs

Cook and of Mr. Morrison. The total yield of the district was 435 ounces from 429 tons of quartz. A fifteen stamp mill has been put up, road made, etc.

TANGIER—The returns show 360 ounces from 936 tons of quartz, compared with 431 ounces from 874 tons in 1885. A little work was done on the Strawberry Hill property. Mr. Miller worked on the Leary Lead, and Mr. Murphy took out some ground in the west end of the Nugget lode workings. In Mooseland a little work was done by Mr. Irvine, and some prospecting carried on by Messrs. Townsend, Miller and Dissoway.

UNIACKE.—Little work of note was performed here during the past season. The returns show only 320 ounces.

WAVERLEY.—Mr. Huff continued working on the American Hill, the only systematic work performed in the district.

UNPROCLAIMED and other districts.

BEAVER DAM—This mining camp has been revived and has received considerable attention during the season from prospectors. William Yeadon has a party of 12 men in camp developing his property. He has opened up 3 leads that he estimates will pay well to work. Having put up a crusher with one battery of four stamps to test the leads as they were opened, he is now preparing to place the second battery and push the work during the coming season. He has built a dwelling house, shaft houses, barn and blacksmith shop. The mill is run by water. Several other parties are prospecting properties here.

GOLD RIVER—Prospectors have had their interest in this place revived and have paid considerable attention to the exploration of the part of the district lying east of the river. Several large leads have been found. Webster Eaton has been opening up the Mills property and is building a crusher at the mouth of the "Branch" brook. Work has also been done by Heisler and others.

WHITEBURN.—Mining operations and prospecting have been vigorously pushed during the season. Several new leads have been opened up. Two new mills have been put in operation, one on the Parker and Douglas Property, and the Foster mill on the Parker, Cole and Wile property. The works on the Parker and Douglas Company's property have all been put up during the season. The new lead discovered in September to the westward of McBride's hill turned out very rich looking quartz and a number of people bought interests in the Parker, Cole and Wile and Annand areas and put up the Foster mill. McGuire Bros. have opened another lead on their areas.

MALEGA BARRENS is a new district, the first gold being found in June. A very large number of areas were taken up by different parties to prospect on. The outcrops of several lodes shewing gold were found on several properties, and regular mining operations were

commenced on the properties of Wharton & Co. and McGuire and Smith. A road has been built in to the mining properties. This district lies about four miles easterly from Brookfield, Queens Co.

CARLTON, YARMOUTH CO., is a new district, gold being first discovered during the early spring of 1886. Messrs. Hale and Ross acquired the title to the property of Messrs. Crosby and Wyman, and prospected the areas. The outcrop of a good streak of gold was found in the summer and the work of sinking shafts and drifting was rapidly pushed. At Christmas the shafts were down about 100 feet, with about three hundred feet of drifts and about 50 tons of rich ore taken out. Hale and Ross mine is advantageously situated in the village of Carlton, Yarmouth County, and near to the large water power of the Tusket river that drives the saw mills in that place.

CHEZZETCOOK.—On the Oxford property, a small lead running under the battery, and from one-half to three inches thick, was opened in the fall and proved very rich.

At Rawdon the two mines have continued working steadily; and the district has become a large and steady producer. Some work has been done at Gold River, Killag, Leipsigate, Pleasant River, and reports of gold finds have been received from numerous points.

IRON MINING.

During the past season the Mines of the Steel Company of Canada at Londonderry have been steadily worked. The output was 44,388 tons of brown and white ores. There were also 947 tons of ankerite quarried for a flux, in addition to 13,729 tons of limestone from Mr. McDonald's quarry near Brookfield.

Discoveries of iron ore were reported from Grand Lake, Halifax Co., and from the Long Island District, Cape Breton Co. Here Mr. Greener opened the outcrop of two beds of red hematite of excellent quality up to ten feet in thickness. They are situated very favorably, being on the side of a high hill and only a few yards from deep water.

GYPSUM.

The exports for the year were 123,753 tons compared with 94,044 tons in 1885. Mr. Dimock shipped largely from his Windsor quarries, and 23,272 tons were extracted at Cheverie. The Messrs. McCurdy, at Baddeck, shipped about 4,000 tons from their quarries at St. Ann's Harbor.

ANTIMONY.

It is stated that American capitalists have purchased the Rawdon Mine from the local owners, and propose to largely increase its production. Last year 645 tons were shipped.

COPPER.

During the past season exploratory and preparatory work has been continued at the Coxheath Mines. The drifts on the various levels have shown new bodies of ore large in extent, and carrying good percentages of copper.

Mr. E. D. Peters, the well-known copper metallurgist, sums up the results of a trial on a practical scale of the Cape Breton (Coxheath) copper ores, iron ores, coke, and limestone as follows:—

1st.—That the ore can be smelted in a blast furnace producing a clean and fusible slag.

2nd.—That the Sydney Coal field produces an excellent coke that will smelt over seven times its weight.

3rd.—That the iron ore and limestone of the district furnish a cheap and excellent flux for the Coxheath.

4th.—That a light grade matte can be produced from the smelting of the raw ore with without any preliminary washing.

5th.—That taking into consideration the prices of fuel, flux, and labor, copper smelting can be done far more cheaply on Sydney Harbor than at any point in the United States.

From Mr. Peters' tests it appears that 13,450 tons of ore, averaging 52 per cent. of copper, being smelted with the necessary fluxes and coke at the rate of one ton of coke to seven of mixture, yielded a clean matte of the following composition:

Copper	37.2
Iron	28.6
Sulphur	33.4
Arsenic	00.0
Antimony	00.0
	<hr/>
	99.2

The slag contained under one-third of one per cent. of copper.

The discovery of lodes carrying sulphur ores with copper, and rich copper pyrites was reported from the Long Island district on properties owned by Messrs. Greener, Ingraham, and others, of North Sydney.

MANGANESE.

Mr. Stephens reports that about 200 tons were extracted at Tenny Cape.

At Onslow Messrs. Carter and Archibald took out about 20 tons in the spring, but did not work in the fall. The indications of ore are very extensive in this locality (East Onslow.) The ore hitherto mined has been found in small rounded pieces in the loamy clay and the underlying red sandstone. In the latter it also occurs in thin veins filling cleavage and shrinkage planes. The ore is extracted from open quarry faces, and after hand dressing is jigged and sorted. This ore has a shorter grain than that found at Tenny Cape, but is of excellent quality. Some ore was mined at Cheverie, Stewiacke, and Hantsport. From Wolfville there was exported 250 tons of mineral classed as "Manganese," but probably more correctly ranked as an ochre.

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER, AND CUMBERLAND.

WESTVILLE, N. S.,

31st December, 1886.

E. GILPIN, ESQ.,
Inspector of Mines.

DEAR SIR.—I take much pleasure in forwarding you the annual report of my inspection for the year ending December 31st, 1886.

SPRING HILL MINES.

In my inspection of these mines I learned that gas had been frequently found in the West slope, also in East side of East slope. The management strictly fulfilled the requirements of the law in such cases made and provided. On the eleven feet seam (underlying the South slope seam) to which particular reference was made in my last report, and on which a small shaft was sunk, a slope has now been driven down about one hundred and fifty feet, where a break has occurred, and at this point a bore hole was put down and passed through a six and one-half feet seam, which either overlies the eleven feet seam, or the eleven feet seam is only six and one-half feet thick on the west side of the break. As yet, however, that particular vicinity is not fully prospected, so that it would be premature to say whether this is the eleven feet seam, so-called, or another seam that overlies it.

I have visited this mine once every month during the year, and on each occasion took measurements of the air, and found it satisfactory. The tables annexed shew in all cases the quantity circulating at the discharge. The south slope on December, 18, 1885, was down 830 feet: at the time of my last visit it was 1800 feet deep, and the sinking still in progress. The management are at present putting up a small engine on the 1300 feet level, East Slope, which slope they intend sinking for another lift.

CHIGNECTO MINES.

During my inspection of this mine I found it in good working order, and the air satisfactory. There were however in December signs of fire on No. 4 bord of No. 3 balance, east side of mine, and the

management have taken every precaution to enable them to keep guard and watch over the fire, and prevent it from breaking out and spreading, by building it off with brick stoppings.

JOGGINS MINES

Were idle in January and February; in March I found them started to work. On my visit September 16th, gas had been reported in No. 2 bord, 3rd balance; attention was drawn to the law which was thus complied with. I learned in November that the West Level had been drawn to within 70 or 80 feet of a break, and in December the management had decided to let it stand at that point. The East level is going through a break on East side.

SCOTIA MINE.

On my visit in January I found eleven men at work, and that they had pierced up to the top seam, three feet thick. In February it was overflowed with freshet. A few men were working in March, and it was idle again in April. In July indications of fire appeared, which in August I saw was damped out, and since that time the mine has remained idle.

MINUDIE AND MILNER MINES.

Some little work was done in January and February, but on all my subsequent visits they were idle.

S. E. FREEMAN (OLD LAWSON MINE.)

Work has been going on in a little way at this mine during part of the year. In November they started to hoist coal, and in December were putting up an engine with a view to larger operations.

WM. PATRICK.

During January and March some little work had been done at this mine. It remained idle from that time until my visit on December 3rd, when the management were erecting an engine house at the old slope.

BOSTON MINING CO.'S MINE.

In March I found 9 or 10 men at work here. On April 27, and the subsequent portion of year, it was idle.

STYLES MINE.

I visited this mine on two occasions, and found very little work had been done. At my last visit it was idle, and about 30 tons of coal were lying on the bank.

VALE COLLIERY.

Gas to more or less extent has been given off in various portions of the McBean Mine during the year. In the inspection of working faces and air-ways I found the air satisfactory, but in any heads driven up-hill off the air, very strict precautions had to be used on account of the gas. The management have succeeded in driving through the "trouble" on the East side at the 1800 feet level, and extended their workings several hundred feet in the coal on East side of trouble, and have also laid rails down the slope from 1800 feet level to 2400 feet level, and are hoisting coal from that point. A perceptible increase in the volume of air will be noticed in the Greener Mine in October; the management having succeeded in getting their new air-way in operation, which with larger area, and less friction produces this satisfactory result. An engine has been placed at 1800 feet level to hoist from lower lift to 1800 feet level, and from thence it is taken by the main hoisting engine to the surface.

ACADIA COAL CO., WESTVILLE.

In the mine at each official visit I found the air-ways satisfactory, and the air kept up the working faces. They are taking out the pillars on the 2400 feet level successfully, and on the 3100 feet level extending levels on each side. Although a considerable amount of gas is evolved a sufficient circulation of air is kept up to working faces, and none is allowed to lie. The coal on lower left presents a fine appearance.

INTERCOLONIAL COAL COMPANY.

I visited this mine frequently during the year, and on one occasion two delegates, namely, John Johnson and Thomas Blackwood, appointed by the men, inspected along with me the workings of the mine, which were found satisfactory. During the summer a steam jet was placed in the up-cast shaft, and the fan stopped for several hours, during which time no men were allowed in the mine. The jet being applied restored the circulation to such a degree as indicated that in case of damage or injury to the fan the jet would keep the air to a certain extent circulating. The management have driven a place through the "dike" on the 800 feet lift, which will shorten the air return by some hundreds of yards. The Scott Pit and No. 4 slope have remained idle during the year.

HALIFAX COMPANY.

The McGregor Pit was idle during the year, except that in November a set of men were started to pierce through a balance and obtain a better exit for the air. Ventilation by the fan was kept up during the year, and the water was taken out.

Slopes Nos. 1 and 2. During the year these slopes have been sunk further down in the seam, and at the present time the management

are continuing their operations. No. 1 slope is now down a depth of about 1,400 feet, and No. 2 is down about 1,650 feet. At my visit in August I found the air at one point, viz.: top board on inside balance, No. 1 slope, not all that could be desired. I drew the attention of the management to this, and the defect was promptly attended to. On previous visits, and since that time, the air has been satisfactory.

Water is still being extracted from the Foord Pit by means of iron tanks, and is being lowered at the rate of about one foot per day.

JOHN MUIR & CO

Continued some small operations on the seam at Coal Brook; but during latter part of year suspended work there altogether, and leased the East River area, from B. G. Gray, Esq., Halifax, and moved their plant a few weeks ago to a small slope on said area, which slope was sunk about 100 feet; there is a seam of coal there about four feet thick, which has a good appearance.

During the month of October I visited the Acadian Iron Mines, travelled the workings, and found them well-aired. In August I visited 15 Mile Gold Stream. Travelled Hudson's mine, and the Anderson and Hall mine, and found them in good order. I attach tables giving numbers of serious accidents and causes thereof, volume of air circulating, also a tabulated statement of the various appliances used in discharging water from the mines, etc.

I am, Sir,

Yours very truly,

WILLIAM MADDEN, JR.,

Deputy Inspector of Mines.

DETAILS OF PUMPING APPLIANCES.

COMPANY.	Appliances.	Length of Stroke.	Diameter Steam Cylinder.	Diameter Water Cylinder.	Number strokes per minute.	Steam pressure at boiler.	Distance of pump from boiler in ft.	Steam pressure at pump.	Vertical height of Discharge.	Pressure of head per sq. in. lbs.	Length Steam Pipe.	Length Water Pipe.	Diameter Water Pipes.	Diameter Steam Pipes.	Average gallon discharge per day.	Tons of water raised, year 1886.	Tons of coal raised during year 1886.	REMARKS.
INTERCOLONIAL COAL COMPANY, Westville. Connected.	Cameron Pump, No. 8.	36 in.	18 in.	8 in.	20 to 40	lbs. 80	430	lbs. 79½	350	lbs. 208	800	.....	.....	5 in.	60,000	104,500	108,498	Pipes covered with composition made by Mechanical Engineer.
	No. 3.5.	12 "	10 "	4 "	40 to 60	80	1330	77½	300	130	900	900	3 × 2½	2 × 2½	.....	.....	.....
	No. 3.4.	12 "	7 "	3½ "	40 to 60	1780	1780	75	113	49	400	400	2 in.	2 in.	.....	.....	.....
	Duplex Compound Pump.	24 "	H. P. 12 " L. P. 22 "	5½ "	45	50 lbs.	2600	40	996	433	2600	2400	.....	4 "	120,000 per day of 24 hrs.	219,000	98,891	Pipes covered with composition clay & straw.
Joggins.	Burling and Johnston's Pump.	40 "	20 "	8½ "	15	60 "	1500	33	205	89	1500	600	8 "	4 "	84,000	133,300	22,243	Pipes not covered.
CHIGNECTO.	Cameron Pump.	14 "	14 "	6 "	.....	75 "	600	50	335	167	600	600	3 "	4 "	24,000	43,800	9,148	Pipes not covered.
Vale Colliery. Greeney, or 6 ft. Seam.	Cameron Pump.	24 "	15 "	5 "	50	80 "	1240	70	365	159	1240	1040	.....	.....	144,000	262,800	.....
	Blake Pump.	12 "	8 "	5 "	60	.....	510	.....	130	57	510	310	.....	.....	8,640	.....	.....
	Knowles.	30 "	30 "	8 "	25	70 "	1400	60	650	232	1400	1200	.....	6 "	234,000 to mid. pump.	.....	123,539	Pipes covered to pit head. Balance of pipes in mine exposed.
	Cameron.	30 "	20 "	6 "	50	.....	500	.....	238	103	500	500	.....	4 "	252,000 at surface. Used as a spare pump.	450,900	.....
McBean Seam. Connected.	Matheson Pump.	24 "	18 "	6 "	.....	.....	.....	.....	420	183	900	800	.....	.....	.....	.....	.....

West Slope. Connected.	Top. Allison Pump.	6 ft.	30 in.	14½ in.	15	75 "	750	68	340	148	750	750	12 in.	9 "	Disch'rgs at surface.	1976,000	750 feet of pipes covered.
Bottom. Allison Pump.							1430	55	310	134	680	680	12 "	6 "	Disch'rgs to top pump.		
Special Blake.		3 ft.	28 "	11½ in.	32	60 "	512	40	430	187	890	850	8 "	4 "	742,080	1354,296	
Blake, not used.																	
Special, No. 7.		30 in.	22 "	9 in.	40	60 "		40							460,200	840,960	Covered from boiler to pit mouth with infu- sorial earth.
No. 5.		24 "	15 "	7 "	50	85 "	1500	60	278	121	1500	1400	4 "	3 "	216,000	394,200	
No. 3.		18 "	10 "	4 "	65	85 "	1800	50	32	14	300	300	2 "	2 "	86,400		
Cameron Pump. McGregor Pit.		Idle.															
Boxes.															18,000	32,850	77,807
Foord Pit.		Two	Iron Tanks.	8 ft.	6 in. ×	6 ft. × 3 ft.	40 tanks per ho ur. 22 h. per day.								873,840	1599,758	
LAWSON MINE.															8,000	1,460	
PATRICK MINE.															9,600	17,520	
BOSTON.		Idle.															
SCOTIA.		Idle.															
MINUDIE.		Idle.															
MILNER.		Idle.															

Accidents, Fatal and Serious, during year 1886.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	Jan. 11...	Vale Colliery..	— Livingston ...	Boy	Leg injured. Jammed between two boxes.
2	Feb. 9....	Halifax Co....	James Ferguson ...	Trapper	Leg and arm broke; box running over him.
3	May 3 ...	Spring Hill ...	Murdoch McLeod ..	Miner	Killed by a fall of roof.
4	May 5 ...	Intercolonial ..	David Hayman	Boy	Box passed over him. Died 12th May.
5	May 19 ..	Vale	William Carroll....	Miner	Leg injured; coal falling on him.
6	Aug. 26 ..	Acadia	James McCoul.....	"	Burnt, whilst emptying his powder.
7	Sept. 3 ...	Intercolonial ..	David McPherson..	"	Leg broken; fall of face of pillar.
8	Nov. 1 ...	Spring Hill ...	George Turner.....	"	Fatal fall of top coal.
9	Nov. 3 ...	"	Adam Lorimer	"	Leg bruised; came in contact with rope in slope.
10	Dec. 22...	"	Isaac Conway	"	Burned slightly with gas.

Volume of Air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines during year 1886.

COMPANY.	MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mode of Ventilation.
Spring Hill Coal Company	N. Slope	37,900	39,100	39,200	41,000	45,600	58,000	38,000	52,000	45,500	42,100	43,300	42,500	2 Fans and Furnace Natural Ventilation.
	W. "	31,600	28,000	39,000	34,020	33,600	32,400	41,000	35,300	29,400	32,000	32,600	32,400	
	E. "	42,800	41,100	41,900	36,600	35,200	34,500	23,200	31,500	28,600	33,200	35,200	36,200	
	S. "	12,800	13,000	11,300	11,200	11,120	10,900	10,800	10,200	11,000	11,500	12,100	13,500	
Chignecto Mine	Slope	24,000	17,000	23,500	22,300	21,500	20,800	20,200	21,200	22,500	23,200	23,000	25,700	Furnace.
Joggins	"	22,000	Idle.	22,500	21,200	22,300	25,200	24,200	Idle.	26,800	Idle.	24,200	26,300	Furnace.
Scotia	"	8,800	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Natural Ventilation.
Milner	"	5,000	4,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Natural Ventilation.
Patrick	"	3,000	.....	2,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	Natural Ventilation.
S. E. Freeman (Lawson Mine.)	Slope	3,200	Idle.	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	Natural Ventilation.
Intercolonial Coal Co., Westville	Slope	83,600	98,800	80,800	85,500	81,500	98,800	96,200	78,600	87,400	95,000	86,600	89,200	Exhaust Fan.
Acadia Coal Comp'y, Westville	Slope	65,000	Idle.	62,100	63,000	65,600	66,000	65,000	57,400	64,000	68,000	59,200	62,000	Exhaust Fan.
Halifax Company	No. 1 slope	30,000	27,700	27,700	27,700	22,000	16,500	17,000	17,300	25,400	27,500	20,500	32,900	Furnace.
Stellartown	No. 2 slope	21,000	25,200	22,100	21,000	Idle.	Idle.	Idle.	Idle.	18,700	23,800	24,500	26,200	Furnace.
Vale Company	McGre- gor Pit.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Exhaust Fan.
	w. side.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Exhaust Fan.
	S. side.	45,700	46,500	60,000	50,000	42,000	42,000	44,000	47,500	47,000	40,000	40,600	41,000	Exhaust Fan.
	McBean slope	21,700	46,500	21,600	32,400	34,000	34,600	34,400	30,600	28,000	55,700	Idle.	Idle.	Blower and down Fan.
	Greener slope	21,700	46,500	21,600	32,400	34,000	34,600	34,400	30,600	28,000	55,700	Idle.	Idle.	Blower and down Fan.

CAPE BRETON.

BRIDGEPORT, January 5, 1887.

E. GILPIN, ESQ.,

Inspector of Mines:

DEAR SIR,—I beg leave to forward a report of my work as Deputy Inspector of Mines for the Island of Cape Breton, for the year ending December 31st, 1886.

SYDNEY MINES.

This mine I have visited twelve times during the year, and found it working in the usual systematic manner. On the south side, in the main entry, in several places part of the roof has been taken down for the purpose of making it safe and increasing the area of the air course. This is decidedly an improvement, and if more had been done it would be still better. On the north side a roadway has been driven about 70 chains through the pillars and old workings for the purpose of straightening and shortening the haulage in that direction. In March, 1885, when the north-eastern district was submerged for the purpose of putting out the fire, I learn from Mr. Brown, that the quantity of water let in was 74,000,000 gallons; out of that quantity there has been 26,000,000 gallons pumped out in the year 1885, and in 1886 there has been pumped 18,500,000 gallons, and there still remains to be pumped 29,500,000 gallons. The water is now under control and divided in two sections. The north section will probably be pumped out next season, and then attention will be directed to the east section. I understand that it is the intention of Mr. Brown to leave a strong barrier between this and the new works for the purpose of making a standage for water in case at any time leakage may take place in the iron tubing of the shaft. This would save the working parts of the pit and give ample time for repairs.

VICTORIA MINES.

This mine has been worked vigorously during the past year. I have made eleven official visits through it, and found the Mines Regulation Act observed. The ventilation is good on both sides of the slopes. On the east side there are four different splits, all returning separately to the upcast. A little gas began to show in the west levels last March, and as soon as it was brought to the notice of the agent he immediately put on shot-firers. The levels have been extended on both sides. A new pump has been placed at the bottom of the centre slope to replace the two referred to in previous reports. It is the same kind as at Langan, and designed by Mr. Elliot, engineer of the Langan Mines. Those pumps give good satisfaction. On the surface at the mine there has been put up a new reciprocating screen for the purpose of making nut coal.

BARRASOJS.

There has not been any work done here for the last seven months of the year.

LINGAN MINES.

I visited this mine ten times during 1886. It was kept working pretty steadily, but did not ship much coal. It is now closed down the rails and pumps have been taken out. It will likely fill with water to the upper level that runs to the sea shore. In travelling through this mine, I found that the pillars were strong and regular, and the timbering good. I must say that the ventilation was good through all parts of the mine.

OLD BRIDGEPORT.

I have visited this mine nine times. The headways mentioned in my last report have been driven and a shaft sunk to connect with one of them for the purpose of ventilation. The other, as was intended, has not been yet driven through the surface for a travelling road. The management says that it is the intention to drive this through next season, and build a furnace and cupola. This is much required, as I found on some of my visits in hot and calm weather, that the air was rather feeble at the face of some of the workings on the south side of the pit. The attention of the underground manager was drawn to a weak part of the roof on the south side, where the pillars were rather far apart, and he promised to secure it. In all other matters the requirements of the law are satisfied.

INTERNATIONAL.

I have visited this mine thirteen times during the past year. The dips have been driven to gain a new lift, where it is the intention to place thirty pairs of miners to work next season. A new Knowles pump is being placed there for the purpose of pumping the water to the upper level. A little gas has made an appearance at the face of the dips; it is the first of any account that has been seen at the mines. The ventilation is a little sluggish in some parts of the lower workings owing to the great distance from the furnace, and the large area it has to go through; however, it is well distributed and so far gives satisfaction. A new engine has been placed at the south side of the pit bottom for the purpose of drawing the coal to that point by means of a tail rope. I noticed at this mine, along the engine plane, that the corners of the refuge or man-holes have been whitewashed. I think this a very good idea, and if adopted in all the mines, would save some accidents, as the entrance can be seen at a greater distance. The cost is very small, a little lime and water answering the purpose, and where the pit is not damp, would remain bright a long time.

RESERVE MINE.

I made fourteen visits to this mine during the past year. The ventilation at this mine is about the same as 1885. On some of my inspections I found it a little thick in some of the boards, owing to so much powder being used there. The underground manager urged the men to fire in the afternoon, and this had a better effect. I may also add that he has used his endeavors to satisfactorily ventilate the faces of the different districts. Mr. Routledge has informed me that it is his intention, this winter, to build a new and higher cupola in place of the present one. Also, that he intends driving to the dip from the east slope to gain a new lift. The coal mined here this season was chiefly taken from the French, or east slope, and a portion which was taken out of south slant of east slope. A few pillars were taken out of No. 4 north landing on main slope. Last winter a shaft was sunk from the Reserve to the Emery seam for the purpose of ventilating the Emery Works.

CALEDONIA.

This mine was inspected by me eleven times. I found this mine in good condition. The slants were driven 300 feet further to the dip and a new lift gained, levels extended east and west, and boards broken off them. This section of the mine showed a good deal of gas, but great care and good ventilation render it harmless. A large portion of the coal shipped was taken from the dip slants, some from the pillars to the rise on the east side, and the remainder from the west side. The roof coal has been taken down where it was tender along the main road on east side, and new booms and timber put up there in order to make it safe.

LITTLE GLACE BAY.

I inspected this mine nine times during the past year. The work was not brisk the past season. I found the works carried on in a very satisfactory condition. The air much better than in 1885. It has been checked and sent closer to the face of the boards. There has also been a great deal of timbering done and stone blocking built up along the main roads for the purpose of safety. The roof in this part of the mine is very bad and requires great attention, especially as the works extend towards the rise. The boiler shed has been completed on the surface and three more boilers placed therein, making a total of six boilers. This is one of the best boiler sheds in this County, being built of an excellent quality of sand stone, quarried below high water mark on the sea shore.

ONTARIO.

This colliery was visited by me nine times. On my visit in June I found the air very thick at the face of the workings, and on examination found the cause to be that the air-way that was below the level was being closed up by the water raising from the dip. I

suggested that the door be taken down in the level or horse road, and stop the front of the rooms, and put up doors at intervals to admit the coal to come out. As soon as practicable this was attended to and the air allowed to go in to the face of the levels and return through the rooms to the furnace. This gave better satisfaction. The coal raised from this mine was all mined above this level on the south side of the slope. The timbering in the boards was fairly satisfactory. A great number of the props and booms in the slope had to be replaced owing to decay, a little more timbering would not be amiss in order to make it safe.

BLOCK HOUSE.

About the 24th of March the roof broke away below the brook, and the pit would have been drowned out, but for the energy of the officials and workmen. The opening was stopped, and made tight by them, and the pit saved. In the first of the season a small quantity of coal was shipped. About the 20th of August the plant was sold. In the later part of the season a few more cargoes of coal was shipped. In all I visited this colliery thirty times, chiefly for the purpose of looking after the extraction of the plant which was removed and stored satisfactorily. The works are now filling up with water, and in a very short time will be filled to tide level.

GOWRIE.

I visited this colliery fourteen times. In all my inspections at this mine I found the mines regulation act strictly fulfilled. The timbering all through the mine is kept in the best condition. The air is good. What chiefly adds to its purity is that very little powder is used in blasting the coal. The quantity of air has been considerably increased by a new and separate inlet through the east levels to the dip workings. The roads and ropes are in good condition and everything appears to work well. A large quantity of the coal shipped was taken from the new lift in the dip workings. The roof stone is much harder than to the rise, and the splint above the coal is very much thinner. The manager says the coal has improved in its quality.

CHIMNEY CORNER.

I paid an official visit to this mine on the 15th of July. I was informed that the work had started there on a small scale on the 2nd of May, and from that date until the date of my visit they had shipped three small cargoes. A vessel was being loaded while I was there, and five miners were at work. I did not consider one or two places in the main entry safe, owing to a great pressure on the timbers, which were on the point of breaking, this I brought to the notice of a man named Kenneth McIntosh, who was in charge, he promised to have it attended to at once and secured. A new outlet was driven for ventilation from the face of the outside board to the surface, and crop of coal. There is no furnace at this mine.

The air was very dull when measured, owing to the day being very calm and hot, 500 feet is all the anemometer showed. I did not see Mr. Evans the proprietor of the mines. I was informed that he had gone to England.

I also visited Broad Cove on the 15th of July. At the mine there has not been anything done for a number of years. The timbering in levels and mouth of slope were decayed, and a part of the roof has fallen in. There was a small opening in the side of the bank towards the crops of the coal, where some had lately been taken out for home consumption. Mr. Hugh Ross, who had taken charge of the place, was in Halifax during my visit.

I also beg to enclose tables showing amounts of air measured on my visits, accidents and cause, pumps, etc. In conclusion I must say that the Mines Regulation Act has been very fairly observed through the mines here.

I remain your obedient servant,

PATRICK NEVILLE,

Deputy Inspector of Mines.

Report of No. of cubic feet of Air measured in Mines in Cape Breton year, 1886.

COLLIERIES.	January.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.
Sydney Mines.....	.....	53,500	50,540	56,590	57,180	59,800	60,000	53,680	67,920	68,140	68,810	64,140
Victoria	30,700	25,600	22,200	30,600	31,000	.....	22,260	22,260	29,230	30,080	26,460	26,460
Barrasois	4,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lingan .....	.....	.....	27,500	27,900	27,000	23,000	24,700	24,000	24,350	25,000	.....	.....
Old Bridgeport .....	.....	3,800	3,000	2,000	3,000	2,000	2,800	.....	3,500	7,700	9,550	14,800
International	10,000	10,000	15,000	24,000	29,400	36,400	32,000	40,240	35,940	40,380	10,500	.....
Reserve	20,000	15,000	20,000	28,680	31,000	20,760	26,460	30,180	27,150	26,700	33,000	20,000
Caledonia .....	.....	10,000	12,000	33,000	36,540	35,000	36,140	38,580	38,720	37,560	37,600	32,000
Little Glace Bay	9,800	.....	.....	15,500	21,150	20,200	15,000	20,000	18,720	.....	23,590	20,000
Ontario .....	.....	.....	.....	.....	6,000	4,550	4,700	5,000	4,000	6,000	5,000	14,800
Block House .....	.....	.....	15,000	18,000	20,000	.....	.....	10,000	.....	10,000	9,500	4,500
Gowrie .....	.....	13,000	20,000	25,000	40,000	40,000	39,500	41,500	32,460	38,000	42,000	46,660
Chimney Corner .....	.....	.....	.....	.....	.....	.....	500	.....	.....	.....	.....	.....

Report of Accidents in Mines in Cape Breton for the year 1886.

Date.	Name of Mine.	Name.	Occupation.	Remarks.
Feb. 23 ...	Sydney Mines.	John McNeil.....	Miner	Burned by powder explosion from can while loading.
"	"	Michael McNeil....	"	" " " "
March 5...	Victoria	Michael Gardiner ..	"	Slightly burned from gas.
" 18...	Sydney Mines.	Alex. Corwill.....	Overman .	"
" 29...	Gowrie	Chas. Carmichael ..	Machinist.	Arm broken by fall from scaffolding at pit head on surface.
April 17...	International..	Edmund Gouthow..	Miner	Ankle bone broken by piece of coal rolling from junk on him.
May 8....	Little Glace Bay	Rodk. McDonald...	Driver ...	Bone broken in wrist between two tubs.
" 10....	Reserve	Thomas Henessy ..	Miner	Arm broken by fall of coal from face. Arm amputated.
" 11....	Sydney Mines.	George Kay.....	Overman .	Ribs broken between tubs on incline plane.
" 17....	Reserve	John Corbett.....	Miner	Leg broken by fall of coal from roof.
" 20....	Gowrie	Malcom McKinnon.	"	Ribs broken by fall of coal from face.
" 21....	"	Neil Lamond.....	"	Leg broken by fall of stone pot from roof.
"	"	Daniel McKeagan..	"	Body bruised by " "
" 31....	Sydney Mines.	Matthew Corkery..	Labourer .	Burned slightly by gas from roof.
"	"	Alex. McGowen....	Miner	Dropped dead at face of his board from heart disease.
July 11 ...	Caledonia.....	Charles McGregor..	"	Bruised from fall of coal from roof.
Oct. 19....	Sydney Mines.	Daniel Morrisson ..	Screen Boy	Killed by rope breaking; tub running back on him.

Figures relating to Machinery used in freeing Cape Breton Mines from Water during the year 1886.

COLLIERIES.	Number of Pumps.	Name and Style of Pump.	Steam Cyl'n diam. inch.	Water Plung'r diam. inch.	Length of Stroke.	Strokes per Minute.	Length of water-pipe.	Length of steam-pipe.	Steam pressure at Bank.	Steam pressure at pump.	Vertical Lift.	Gallons water per day.	Tons water per hour.	Tons of Coal raised during 1886.	REMARKS.
Sydney Mines (Queen) ..	1	Made to order.	30	8	48 in.	17	360 ft.	430 ft.	27 lbs.	.....	360 ft.	172,620	261,278	139,646	
do. (New Winn'gs	2	do.	62	20	84 "	4 1/2	720 "	.....	40 "	.....	720 "	139,863	227,901	50,156	
Victoria	1	Elliot.	18	7	44 "	14	590 "	890 "	40 "	37 lbs.	305 "	142,380	232,003		
Lingan	3	do.	18	7	48 "	22	350 "	1340 "	30 "	26 "	80 "				
do. ....	.....	do.	15	5	18 "	50	530 "	2048 "	30 "	24 "	116 "	80,124	131,056	17,688	
do. (Driven by friction)	.....	Made to order.	.....	3	9 "	.....	700 "	.....	.....	.....	150 "	.....	.....
International	2	Cameron.	16	6	30 "	30	.....	1905 "	45 "	20 "	.....	64,000	117,885	118,129 ^o	
do. ....	.....	do.	12	5	12 "	60	3547 "	1592 "	45 "	20 "	185 "	115,984	334,000	81,783	
Reserve	2	do.	12	7	24 "	60	.....	2080 "	50 "	35 "	.....	12,450			
do. ....	.....	do.	14	9	18 "	50	3037 "	1486 "	50 "	35 "	283 "				
Caledonia (two sets) ..	2	Lifting.	.....	8	48 "	12	123 "	.....	30 "	.....	123 "	86,400	170,785	72,810	
do. ....	.....	do.	.....	8	48 "	12	60 "	.....	30 "	.....	60 "				
Little Glace Bay	3	Cameron.	8	8	30 "	40	310 "	340 "	.....	.....	260 "	205,834	334,678	33,382	
do. ....	.....	Lifting.	6	6	48 "	10	255 "	.....	.....	.....	255 "				
do. ....	.....	do.	6	6	48 "	50	255 "	.....	.....	.....	.....
Block House	3	Knowles.	18	9	24 "	58	.....	.....	.....	.....	.....	648,720			
do. ....	.....	Built to order.	12	7	12 "	58	1155 "	.....	.....	.....	115 "	139,984	268,457	5,053	For 5 ms. of year.
do. ....	.....	do.	12	7	12 "	58	.....	.....	.....	.....	.....	139,984			
Gowrie	3	Knowles spec'l	20	10	48 "	36	254 "	244 "	43 "	85 "	215 "	328,265	535,252	95,307	
do. Lifting .....	.....	Built to order.	.....	10	36 "	36	110 "	.....	.....	.....	110 "				
do. ....	.....	do.	.....	10	36 "	36	110 "	.....	.....	.....	110 "				

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, McKay, and others.....	.....	1
	COLCHESTER COUNTY.		
	Moir, Wm. C., et al	Tatamagouche	10½
	CAPE BRETON COUNTY.		
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others .....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al .....	.....	1
94	McKenzie & McKim .....	.....	1
	HALIFAX COUNTY.		
1	McClure, Chas. F.....	Gay's River.....	1
	IRON.		
	PICTOU COUNTY.		
43	Hudson, James.....	East River.....	1
44	Hudson, James.....	"	1
Total area under lease			19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al	N. Side East Bay	1
91	Brookman, S. L.	East Bay	1
93	Brookman, S., et al	" "	1
102	C. L. Ingram	" "	1
103	A. McKenzie, et al.	" "	1
92	Matheson, D., et al.	" "	1
84	Protheroe, Pryse	Cow Bay	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co.	Whycocomagh	1
Total area under lease			27½ square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	McKinnon, et al	ANTIGONISH CO.	3			
		CUMBERLAND CO.				
21	Bligh, James, et al .....	.....	1	.....	
47	Boston, C. M. Co .....	.....	1			
25	Campbell, Alex., et al .....	.....	1			
	" " " .....	.....	2			
	" " " .....	.....	4			
32, 34	Campbell, John .....	.....	8			
35, 48, 49, 50	Campbell, W. ....	.....	1			
31, 33, 37, 38, 40, 41, 45, 46	Cumberland C. M. Co	Chignecto	4	Working.	Jas. Baird	Maccan.
54	} Cumberland R'y & C'I Co.	Springhill	9	"	R. G. Leckie ... }	Springhill.
12	Joggins C. M. Association ..	Joggins	2	"	W. Hall	Joggins.
6, 7, 8, 44, 52, 55	Joggins C. M. Co	Cumberland	2		P. McNaughton ... }	
	Lawson C. M. Co	Maccan	1			
5	Milner, Christopher .....	.....	2			
51, 53	Seaman, Gilbert .....	.....	1	Working.	M. Dunlop	River Hebert
6	Shannon, S. L. ....	.....	2			
24	Shannon, S. L. (in trust) et al	.....	2			
36, 39	Styles Mining Co. (Ltd.) ..	.....	2			
22, 23, 28, 29, 30	Boston Coal Mining Co .....	.....	5		J. S. Hickman ...	Amherst.
9		.....	2			

26, 27	Wright, John V	PICTOU CO.	3		
			53		
1	Acadia Coal Co.....	Fraser	1	Working.	H. S. Poole
3	"	Acadia	1	"	J. Macneil
42	"	Pictou	4	.....
23	"	Vale	3	Working.	T. Turnbull ...
	" .....	.....	4		
	Acadia Coal Co.....	Albion		Working.	John Douglas...
10	Gray, B. G., et al.....	.....	1		
11	Halliburton, R. G., et al...	.....	1		
13, 14	Intercolonial Coal Co.....	.....	2	Working.	Robt, Simpson....
12	"	Drummond	1		
6	Kirby, Lewis R.....	.....	1		
24	Richey, M. H.....	.....	1		
		CAPE BRETON.	20		
3	Archibald, Blowers.....	Gowrie	1	Working.	{ Archibald & Co. North Sydney
2	Archibald, Thomas D.....	"	1		{ Chas. Archibald. Cow Bay.
5, 28	Blockhouse Mining Co.....	Blockhouse	2	Working.	R. Belloni.....
29	" (sea area) .....	.....	1		"
15	Caledonia, C. & R. Co	Caledonia.....	1	Working.	David McKeen...
31	" (sea area) .....	.....	1		
30	International Coal Co .....	.....	1		P. Johnstone
					Bridgeport.

LIST OF COAL LEASES—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
8, 9	Halifax Coal & Iron Co...	Ontario	1½	Working.	<i>Jno. Sutherland</i> .	Pt. Caledonia.
27	General Mining Association	Bridgeport	2	Working.	{ Rich. H. Brown .	Sydney Mines
	" " (sea area) ..	Sydney	18	Working.	{ Cunard & Morrow	Halifax.
	" " (sea area) ..	"	4		{ <i>H. Mitchell</i>	Bridgeport.
38, 39	Low Point, Barasois, and ..	Lingan	13	Working	<i>Donald Lynde</i>	Low Point.
10, 21	Lingan Mining Co. (Ltd.) ..	"	9			
	Gibson, John, et al.	"	2			
4, 12, 16	Glace Bay Mining Co.	Glace Bay	3	Working.	{ E. P. Archbold .	Halifax.
6, 13, 18, 19	International Coal Co., Ltd.	International	4	"	{ <i>Chas. Rigby</i>	Lt. Glace Bay.
66	Merchants' Bank of Canada	Gardener	2		<i>P. Johnstone</i>	Bridgeport.
52, 53	McLeod, Hugh	"	2			
40, 41, 42	Ross, H. E., et al.	"	3			
79	Ross, W. J., et al (sea area) ..	"	1			
32	Sword, Wm. (sea area)	"	3			
23, 25, 70	Sydney & Louisburg Coal	"				
14, 24	and R. R. Co., Ltd.	"				
49	" " " " " " " "	Schooner Pond ..				
64, 65, 68	" " " " " " " "	Reserve	10	Working.	{ F. C. Kimber ..	Sydney.
69	" " " " " " " "	Lorway				
54 to 63	Sydney C. M. Co. (sea areas)	Emery	10		{ <i>W. Routledge</i> ..	Reserve Mines
67	Weatherbe & Kirby	"	1			
78	Weatherbe, R. L. (sea area)	"	5			
96, 97, 98, 99, 100	Low Point, Barasois and	"				

Lingan Mining Co., Lt'd. (sea areas)	Working.	D. Lynk	Low Point.
.....	5		
.....	2		
.....	178½		
INVERNESS CO.			
Chimney Corner.	1	T. Evans.....	Chimney Cor.
.....	1		
.....	2	Alex. Wright....	Moncton.
Port Hood	3		
.....	1		
Broad Cove	1		
.....	1		
.....	2		
.....	1		
VICTORIA CO.	13		
New Campbellton	3		
Black Rock	5		
.....	8		
2 Kenny, T. E.			
3, 4, 5 Ross, William			
8 Evans, Thomas			
9 Evans, Thomas (sea area).			
7, 12 Inverness C. I. & R. C.			
13 McGregor, J. D.			
4 Richey, M. H., et al			
11 Ross, W. J.			
6 Ross, H. E., et al (sea area)			
14, 15 Smyth, Peter.			
10 Tremaine, E. D. (sea area).			
Total area under lease.....224 square miles.			

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	92,557	86,006	71,504	60,298	43,694	6,567	195	183	207,950	153,054
2nd Quarter	100,369	94,938	110,384	92,822	194,880	168,580	.....	.....	405,633	356,340
3rd Quarter	123,178	111,536	130,099	123,519	281,761	292,599	.....	.....	535,038	527,654
4th Quarter	132,517	123,786	102,818	92,387	118,655	120,445	.....	.....	353,990	336,618
Total	448,621	416,266	414,805	369,026	638,990	588,191	195	183	1,502,611	1,373,666
1885	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884	279,964	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883	247,861	222,347	505,626	461,809	668,293	612,614	753	753	1,422,553	1,297,523

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			Other Counties.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia Land Sales	27,695	50,176	24,682	95,368	64,625	....	3,354	5,300	....	183	....	....	126,600	120,101	24,683	271,384
Sea borne.....	427	869	36	35,688	6,835	....	123,481	12,360	9,157	....	....	....	159,596	20,064	9,193	188,853
Nova Scotia, total	28,122	51,045	24,719	131,056	71,460	....	126,835	17,660	9,157	183	....	....	286,196	140,165	33,876	460,237
New Brunswick	27,458	23,232	67,398	28,463	3,083	....	25,909	230	145	....	....	....	81,830	26,545	67,543	175,918
Newfoundland .....	.....	.....	.....	458	.....	....	69,418	1,600	.....	.....	....	....	69,876	1,600	....	71,476
P. E. Island .....	.....	.....	.....	13,649	21,318	....	8,886	5,315	.....	.....	....	....	22,535	26,633	.....	49,168
Quebec.....	9,501	16,575	162,859	92,600	2,899	....	187,911	28,413	38,004	....	....	....	290,012	47,887	200,863	538,762
West Indies	5,021	336	.....	.....	.....	....	10,691	673	.....	.....	....	....	15,712	1,009	.....	16,721
United States .....	.....	.....	.....	2,160	1,880	....	19,967	23,599	3,040	....	....	....	22,127	35,479	3,040	60,646
Other Countries .....	.....	.....	.....	.....	.....	....	718	20	.....	.....	....	....	718	20	.....	738
Total.....	70,102	91,188	254,976	268,386	100,640	....	450,335	87,510	50,346	183	....	....	789,006	279,338	305,322	1,373,666
1885.....	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	....	....	....	778,378	247,676	228,456	1,254,510
1884.....	155,999	102,406	.....	330,309	133,872	....	459,210	70,845	.....	.....	....	....	945,518	316,132	.....	1,261,650
1883.....	152,453	69,894	.....	319,859	141,950	....	543,419	69,195	.....	687	66	....	1,016,418	281,105	.....	1,297,523

COAL—SALES.

Markets.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1886.	Year 1885.
Nova Scotia.						
Land Sales..	64,084	64,928	63,743	78,629	271,384	255,808
Sea borne...	5,014	38,405	84,231	61,203	188,853	188,844
N. S.—Total ..	69,098	103,333	147,974	139,832	460,237	454,652
N. Brunswick .	30,573	34,869	57,426	53,050	175,918	148,634
Newfoundland.	1,223	12,615	35,780	21,858	71,476	74,322
P. E. Island ...	.....	10,094	23,737	15,337	49,168	52,770
Quebec.	51,288	140,678	242,422	95,374	538,762	493,917
West Indies ..	410	6,778	1,177	2,999	11,364	5,732
United States .	.....	38,697	19,138	8,168	66,003	34,483
Other countries	462	276	.....	.....	738	.....
Total....	153,054	356,340	527,654	336,618	1,373,666	1,254,510
1885..	125,351	309,513	510,787	308,859	1,254,510	
1884..	138,303	307,915	486,601	328,821	1,261,650	

COAL.—GENEALRL STATEMENT.

1886.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	207,950	153,054	37,272
2nd "	405,633	356,340	35,651
3rd "	535,038	527,654	32,725
4th "	353,990	336,618	36,773
Total.....	1,502,611	1,373,666	142,421
1885	1,352,205	1,254,510	127,624
1884	1,389,295	1,261,650	116,769
1883	1,422,553	1,297,523	111,949

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1886.

COLLIERIES.	SEAMS.	Produce.	SALES.				COLLIERY CONSUMPTION.			
			Round.	Slack.	Run of Mine	Total.	Per Cent.	Engines.	Workmen.	Per Cent.
CUMBERLAND Co.	North	9,148	5,292	1,435	800	7,527	82	1,402	195	17
	Chignecto	22,243	15,666	3,131	.....	18,797	80	2,313	584	13
	Joggins	50	.....	.....	.....	.....	.....	.....	.....	.....
	Lawrence	416,769	48,750	86,550	254,176	389,476	93	17,178	4,376	5
	Spring Hill	411	394	72	.....	466	.....	.....	5	.....
	Scotia .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pictou Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Acadia	98,891	56,139	36,393	.....	92,532	94	4,863	1,950	7
	Third and McGregor	77,807	38,088	22,408	.....	60,496	77	13,895	3,400	22
	McBean and Six Feet	128,539	93,977	27,802	.....	121,779	94	5,797	2,333	17
Acadia Co. { Albion { Vale {	Acadia	108,498	79,702	13,907	.....	93,609	87	17,533	1,516	6
	Intercolonial	1,070	480	130	.....	610	.....	240	125	.....
	New Glasgow .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	CAPE BRETON Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Barasois	87	94	.....	.....	94	.....	.....	24	.....
	Blockhouse	5,063	2,913	.....	.....	2,913	.....	1,267	983	.....
	Bridgeport	14,344	11,189	1,330	.....	12,519	87	230	287	3
	Phelan	72,810	49,404	23,644	.....	73,048	100	1,236	1,091	3
	Caledonia	1,996	1,530	466	.....	1,996	100	.....	.....	.....
	Franchlyn	33,382	26,588	2,535	.....	29,123	87	3,123	922	12
Gowrie { Gowrie { Gowrie { Gowrie { Gowrie { Gowrie { Gowrie { Gowrie { Gowrie { Gowrie {	Harbor	95,307	71,171	17,774	.....	88,945	92	3,160	3,410	6
	Harbor	58,393	9,752	38,004	.....	106,149	90	6,776	2,067	6
	Harbor	12,365	2,548	145	.....	15,058	85	2,076	1,100	12
	Lingan	8,111	140	.....	.....	8,251	99	180	168	.....
	Phalen	81,783	15,854	.....	.....	83,402	100	4,156	4,068	10
	Phalen	139,646	9,533	.....	.....	119,949	85	15,947	7,391	11
	Sydney	50,156	3,936	.....	.....	46,744	93	3,563	1,491	10
	Victoria .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	INVERNESS Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Broad Cove	105	100	.....	.....	100	.....	.....	.....	.....
Ross	90	83	.....	.....	83	.....	.....	.....	.....
Total	1,502,611	789,006	279,338	305,322	1,373,666	.....	104,935	37,486	.....

COLLIERY CONSTRUCTION ACCOUNT.—1886.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting.	Total.
CUMBERLAND COUNTY.											
Chignecto
Joggins	\$ 150 00	.....	.....	.....	.....	.....	.....	.....	\$ 150 00
Lawrence
Springhill	\$ 831 00	.....	\$5616 00	\$2650 00	.....	\$375 00	.....	.....	\$1827 00	11299 00
Scotia
PICTOU COUNTY.											
Acadia Co. { Acadia
{ Albion
{ Vale	1388 00	316 00	181 00	.....	.....	\$ 91 00	.....	.....	1976 00
Intercolonial	5000 00
New Glasgow
CAPE BRETON COUNTY.											
Barrasois	332 00	.....	.....	.....	.....	.....	.....	.....	.....	332 00
Blockhouse
Bridgeport	\$ 200 00	.....	400 00	.....	.....	.....	.....	125 00	.....	.....	725 00
Caledonia	2176 00	554 00	.....	.....	.....	.....	.....	.....	.....	2730 00
Franklyn
Glace Bay
Gowrie	1558 00	.....	.....	.....	.....	.....	.....	.....	.....
International	\$296 00	.....	.....	.....	.....	.....	1854 00
Lingan	417 00	.....	.....	.....	.....	.....	.....	.....	.....
Ontario	81 00	10 00	.....	.....	.....	.....	.....	.....	417 00
Reserve	1545 00	.....	.....	.....	.....	.....	.....	.....	91 00
Sydney	\$2052 00	1912 00	.....	.....	140 00	55 00	.....	.....	.....	.....	5704 00
Victoria	1167 00	.....	.....	.....	.....	.....	.....	1107 07
{	4440 00	1827 00	185 00	.....	312 00	486 00	.....	.....	7250 00
INVERNESS COUNTY.											
Broad Cove	20 00	106 00	.....	.....	.....	24 00	.....	.....	.....	150 00
Ross
	\$2252 00	\$5271 00	\$10639 00	\$8876 00	\$3156 00	\$351 00	\$711 00	\$702 00	.....	\$6827 00	\$38785 00

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average num-ber of tons per cutter.	Average tons per day per cutter.	Average quan-tity raised per day.	HORSES.		PITS WORKED
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Persons.	Above.	Below.							
CUMBERLAND Co.																				
Chignecto	11	3	3	4,308	2	5	1	2,311	...	...	...	25	6,619	831	3.7	42	1	1	218
Joggins	29	4	7	8,497	6	20	7	7,635	...	...	...	73	16,132	767	4.3	127	4	2	175
Lawrence .....	...	...	...	...	...	...	...	...	3	1	...	4	60	...	...	...	...	...	...
Springhill	412	237	125	199,755	66	129	13	53,028	14	9	4,747	1,005	257,530	1,011	4.	1,653	10	45	252	
Scotia	7	...	...	255	1	...	...	53	...	...	...	8	308	...	...	...	1	...	53
PICOU Co.																				
Acadia Co.—Acadia.	91	96	28	45,272	18	40	7	17,186	...	...	...	280	62,458	1,085	5.	497	8	5	199
“ Albion.	105	66	37	42,191	55	59	23	34,766	...	...	...	345	76,957	741	3.3	347	14	6	224
“ Vale ..	203	109	20	76,377	35	67	10	27,928	...	...	...	444	104,300	633	3.7	756	4	10	169
Intercolonial	128	50	55	49,625	33	50	8	24,459	1	...	177	325	74,261	847	3.5	448	8	17	242	
New Glasgow	4	1	...	1,590	2	...	...	452	...	...	...	7	2,042	250	...	...	...	...	180
CAPE BRETON Co.																				
Barrasois .....	...	3	...	207	...	2	...	138	...	...	...	5	345	...	...	...	...	...	38
Blockhouse	16	1	6	2,356	5	10	2	3,714	...	...	...	40	6,070	316	4.5	...	3	3	70
Bridgeport	14	2	2	3,568	2	1	2	1,662	1	...	129	24	5,359	1,024	9.9	135	1	2	106	
Caledonia	82	6	21	19,203	15	22	10	10,817	10	1	2,245	188	32,265	900	5.3	428	5	15	170	
Franklyn	4	1	1	974	1	1	...	507	...	...	...	8	1,481	499	...	...	...	...	...
Glace Bay	61	6	13	8,158	27	19	3	12,535	...	...	...	129	20,693	547	3.8	236	6	14	141
Gowrie	119	13	40	28,600	41	58	20	22,096	1	...	75	292	50,771	800	5.9	700	9	18	135	
International	150	31	41	16,353	31	47	5	7,068	...	...	...	305	23,421	787	4.8	722	6	34	162
Lingan	49	6	15	9,778	3	21	6	5,440	...	...	...	100	15,218	400	2.5	114	4	7	155
Ontario	15	2	5	3,398	3	8	2	2,461	...	...	...	35	5,859	570	5.	74	3	3	114
Reserve	137	15	40	34,874	16	18	9	9,865	4	1	1,100	240	45,839	599	3.4	467	6	15	175	
Sydney	213	37	92	67,992	56	80	40	45,037	4	...	1,100	522	114,129	650	3.4	723	11	40	193	
Victoria	86	20	10	31,325	5	34	8	14,533	...	...	...	163	45,858	583	2.	170	3	3	296
INVERNESS Co.																				
Broad Cove	5	3	...	...	2	...	...	9	...	...	...	10	104	...	...	...	1	...	...
Ross	3	3	1	60	1	...	...	30	...	...	...	8	90	...	...	...	1	...	30
	1944	615	562	654,811	426	691	176	303,725	38	12	9,633	4,585	968,769	...	...	...	...	...	...

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1869	257,485	\$1 25
1851	116,274	"	1870	168,180	"
1852	87,542	"	1871	165,431	"
1853	120,764	"	1872	154,092	75
1854	139,125	Free	1873	264,760	"
1855	103,222	"	1874	138,335	"
1856	126,152	"	1875	89,746	"
1857	123,335	"	1876	71,634	"
1858	186,743	"	1877	118,216	"
1859	122,720	"	1878	88,495	"
1860	149,289	"	1879	51,641	"
1861	204,457	"	1880	123,423	"
1862	192,612	"	1881	113,728	"
1863	282,775	"	1882	99,302	"
1864	347,594	"	1883	102,755	"
1865	465,194	"	1884	64,515	"
1866	404,252	"	1885	34,483	"
1867	338,492	\$1 25	1886	60,646	"
1868	228,132	"			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

Nova Scotia Coal Sales, from 1785 to 1886 (inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670		1847	201,650	
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320	51,048	1851	153,499	
1796	5,249		1852	189,076	
1797	6,039		1853	217,416	
1798	5,948		1854	234,312	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775		1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	
1805	10,130	70,452	1861	326,429	
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336	91,527	1871	596,418	
1816	8,619		1872	785,914	
1817	9,284		1873	881,106	
1818	7,920		1874	749,127	
1819	8,692		1875	706,795	
1820	9,980		1876	634,207	
1821	11,388		1877	697,065	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	
1825		1881	1,035,014		
1826		1882	1,250,179		
1827	12,600	1883	1,297,523		
1828	12,149	1884	1,261,650		
1829	20,967	1885	1,254,510		
1830	21,935	1886	1,373,666		
1830	27,269	140,820	Total.....		24,919,113
1831	37,170				
1832	50,396				
1833	64,743				
1834	50,813				
1835	56,434				
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198	839,981			

SUMMARY.

1785 to 1790	14,349	1831 to 1840	839,981
1791 to 1800	51,048	1841 to 1850	1,533,798
1801 to 1810	70,452	1851 to 1860	2,399,829
1811 to 1820	91,527	1861 to 1870	4,927,339
1821 to 1830	140,820	1871 to 1880	7,377,428

GOLD GENERAL STATEMENT FOR THE YEAR 1886.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1886.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Quartz, etc., crushed.	Yield per Ton.		Maxim. Yield per Ton.		Total Yield of Gold.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Caribou	3	15394	3	2	1	3087	0	14 10	2	1	2233	17 16
Darr's Hill	1	27221	1	...	1	11628	0	11 4	1	6	6509	0 0
Montagu	1	1434	2	2	...	77	1	2 18	9	1	87	14 0
Oldham	3	13043	2	1	1	1026	2	2 20	12	1	2199	3 23
Renfrew	1	3679	2	...	2	428	0	18 15	1	0	233	17 0
Sherbrooke	6	17669	7	3	4	2850	0	9 10	3	18	1341	3 9
Stormont	2	3142	2	2	...	429	1	0 6	1	18	435	0 0
Tangier	2	6399	2	2	...	936	0	17 17	1	7	360	19 14
Uniacke	2	3146	3	3	...	1263	0	5 2	2	0	320	17 3
Waverly	1	2736	1	1	...	508	0	12 22	1	19	329	2 0
Unproclaimed, &c.	5	35017	10	7	3	6778	1	7 0	17	10	9312	0 22
Total	27	128880	35	23	12	29010	0	16 2	17	10	23363	5 15

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.						DARR'S HILL.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	2	1333	53	213	75	5	2	1	.....	..	947	1297	..	..
February.....	2	1172	46	274	149	13	20	1	.....	..	840	612	..	..
March.....	3	1633	65	.....	1	3	15	1	.....	..	1147	1045	..	..
April.....	2	1144	46	295	160	7	..	1	3110	124	1065	730	..	..
May.....	4	1228	49	260	480	10	..	1	3060	122	985	373	..	..
June.....	3	1016	40	247	181	15	1	1	2880	115	983	562	..	..
July.....	3	1281	50	177	181	12	6	1	3017	121	1061	342	..	..
August.....	5	1260	50	345	239	13	6	1	3080	123	803	383	..	..
September.....	2	1075	43	503	291	4	..	1	2998	120	873	269	..	..
October.....	2	1258	50	136	76	16	..	1	3116	124	1043	296	..	..
November.....	4	1461	58	283	109	..	7	1	3000	120	955	297	..	..
December.....	6	1533	61	354	286	17	7	1	2960	119	926	303	..	..
Totals.....	3	15394	.....	3087	2233	17	16	3	27221	.....	11628	6509	..	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

MONTH.	MONTAGU.						OLDHAM.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	1	1434	....	77	87	14	..	3	13043	.....	1026	2199	3	23
February.....	1	10	....	....	..	..	..	2	866	34	56	25	2	9
March.....	1	179	7	....	..	..	..	2	882	35	70	155	1	..
April.....	1	64	....	....	..	..	..	2	1166	47	94	75	16	..
May.....	1	143	6	....	..	..	..	2	973	39	93	315	3	4
June.....	2	263	10	8	14	9	..	4	1353	54	98	401	14	5
July.....	1	10	....	....	..	..	..	4	1227	49	96	174	6	12
August.....	1	179	7	....	..	..	..	3	970	38	144	403	13	17
September.....	1	308	12	....	..	..	..	4	1193	47	45	46	16	..
October.....	1	342	13	....	..	..	..	3	1034	41	65	105	13	..
November.....	1	125	5	21	61	2	..	4	1143	45	126	209	10	..
December.....	1	125	5	45	8	5	..	3	1118	45	25	61	2	..
Totals.....	1	1434	....	77	87	14	..	3	13043	.....	1026	2199	3	23

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.---(CONTINUED).

MONTH.	RENEW.						SHERBROOKE.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	561	22	145	68	6	..	5	1456	58	240	98	2	7
February	1	426	17	121	58	7	..	5	1080	43	99	72	17	0
March	1	510	20	92	92	12	..	6	1525	61	277	278	7	4
April	1	236	9	10	..	12	..	6	1040	43	242	96	4	..
May	1	263	10	.....	..	..	..	6	1430	57	171	63	17	10
June	1	212	8	10	..	7	..	8	2015	81	131	70	16	12
July	1	216	8	22	7	5	..	8	1995	80	211	156	6	..
August	1	239	9	28	6	8	..	8	1560	62	392	166	6	..
September	1	256	10	.....	..	..	..	7	1612	68	54	107	2	..
October	1	228	9	.....	..	..	..	6	1560	62	224	49	5	..
November	1	231	9	.....	..	..	..	6	1586	63	390	106	6	..
December	1	301	12	.....	..	..	..	5	810	32	219	75	14	..
Totals.....	1	3679	.....	428	233	17	..	6	17669	.....	2850	1341	3	9

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

MONTH.	STORMONT.						TANGIER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	334	13	37	67	12	..	2	700	28	..	..	..	..
February	1	272	11	43	83	11	..	2	841	33	77	43	10	..
March	2	700	28	10	14	4	..	3	879	35	259	89	13	12
April	2	493	20	60	68	16	12	3	797	32	20	6	19	..
May	1	267	10	21	27	3	12	2	597	24	332	138	12	..
June	1	250	10	25	17	19	..	3	858	34	144	43	..	..
July	1	46	2	1	..	15	12	2	374	15	10	13	6	..
August	1	84	3	1	1	2	..	3	522	22	12	6	..	..
September	1	31	2	80	72	8	12	2	506	29	22	7	10	..
October	2	231	9	71	35	8	..	1	150	6	..	..	..	..
November	2	295	12	23	18	10	..	1	75	3	49	6	14	2
December	2	138	5	57	27	10	..	1	100	4	11	5	15	..
Totals	2	3142	....	429	435	..	..	2	6399	....	936	360	19	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNLACKE.						WAVERLY.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	3	420	17	166	55	14	6	1	504	20	45	24	18	..
February.....	2	375	15	55	6	11	..	1	557	22	43	28	3	..
March.....	2	344	14	33	20	8	..	1	578	23	43	32	14	..
April.....	2	320	13	124	36	13	..	..	.....	.....	39	37	10	..
May.....	2	180	7	109	30	19	6	..	.....	.....	52	43	16	..
June.....	2	119	5	87	28	18	..	..	.....	.....	57	26	8	..
July.....	1	30	1	20	3	9	..	1	350	14	76	38	8	..
August.....	1	50	2	110	24	12	..	1	240	10	25	15	8	..
September.....	1	40	2	156	37	4	..	1	92	4	8	5	2	..
October.....	1	389	16	78	12	17	..	1	140	5	25	23	13	..
November.....	1	592	24	178	34	10	..	1	130	5	36	19	2	..
December.....	1	287	12	147	29	1	15	1	145	5	59	34	..	..
Totals.....	2	3146	.....	1263	320	17	3	1	2736	.....	508	329	2	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNPROCLAIMED.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.
January	2	274	11	140	222	10
February	2	374	18	168	453	10
March	2	516	20	475	746	9
April	3	811	32	305	426	..
May	4	614	24	414	908	4
June	7	1718	69	548	852	7
July	6	5710	228	483	850	10
August	5	5887	231	445	602	14
September	5	5992	239	1256	1725	16
October	6	4054	162	797	1056	..
November	9	4455	178	923	781	4
December	8	4612	184	824	686	15
Total	5	35017	.....	6778	912	00
						22

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156,000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32161		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
Total.	412542	9	4	553823	.....			3766,494		

INTERCOLONIAL RAILWAY.

STATEMENT showing number of tons of Coal received at the following Stations from Mines in Nova Scotia, for Year ending 31st December, 1886.

Stations.	No. Tons.	Stations,	No. Tons.
Halifax	38424	Penobsquis	2137
Dartmouth	6948	Sussex	403
Bedford	574	Apohaqui	23
Windsor Junction	4136	Norton	12
Wellington	68	Passekeag	6
Enfield	454	Hampton	408
Elmsdale	173	Rothsay	62
Milford	60	Coldbrook	6709
Shubenacadie	240	St. John	38618
Stewiacke	273	Berry's Mills	12
Brookfield	128	Weldford	13
Truro	6900	Kent Junction	386
Valley	18	Rogersville	6
West River	36	Chatham Junction	552
Glengarry	24	Derby	6
Hopewell	1393	Newcastle	53
New Glasgow	13391	Bathurst	605
Pictou Landing	82081	Petit Roche	18
Belmont	66	Jaquet River	12
Debert	6	New Mills	12
East Mines	18	Charlo	6
Londonderry	66608	Dalhousie Junction	50
Wentworth	30	Campbellton	102
Greenville	24	Metapedia	106
Thomson	6	Cedar Hall	6
Oxford	424	Little Metis	6
River Phillip	6	St. Octave	6
Athol	6	Ste. Flavie	6
Maccan	6	Rimouski	£1
Nappan	12	Trois Pistoles	45
Amherst	3969	St. Arsene	12
Aulac	305	Riviere du Loup	32
Sackville	1877	St. Roche	13
Dorchester	1044	St. Henri	11419
Memramcook	309	Point Levis	17372
Shediac	235	Chaudiere (Local)	80989
Point du Chene	42	Do. (West)	65732
Moncton	10239	Points E. Ext. Railway	607
Salisbury	1108		
Petitcodiac	289		
		Total	468543

From the following Stations :

STATIONS.	No. TONS.
New Glasgow	27895
Stellarton	128577
Hopewell	666
Drummond	29032
Springhill	276549
Maccan	5824
Total	468543

MONCTON, N. B., February 10th, 1887.

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

IRON ORE MINING.

LondonderryTons. 44,388

AVERAGE FORCE EMPLOYED.

Skilled workmen:

	No. of men.	Days' Labor.
Under ground.....	70	18,932
Above ground.....	14	4,296

Unskilled workmen:

Above ground.....	30	8,024
Under ground.....	52	12,574

166

.....

LIMESTONE.

St. Peters	Tons.	5,441
Pugwash	"	148
Londonderry (ankerite)	"	947
Brookfield	"	13,729
Total		20,265

BARYTES.

Henderson & Potts, }		
Brookfield. }		
.....		Tons. 230
Average force employed daily.....		3

GRINDSTONES, ETC.

Lower Cove,	}			
Cumberland Co.,				
Messrs. A. Seaman & Co				
.....		Tons. 1,600	Value.....\$22,400	

MOULDING SAND.

Windsor	Tons.	200	Value.....\$	200
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MANGANESE.

*Tenny Cape.....	Tons.	171	Value.....\$	12,066
*Cheverie.....	"	6	"	358
Cornwallis	"	250	"	
East Onslow	"	20	"	1,800
Halifax	"	18½	"	590

†ANTIMONY.

Rawdon	Tons.	645	Value.....\$	26,370
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Tenny Cape out-put	Tons.	200		
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†GYPSUM.

Windsor.....	Tons.	96,087	Value.....\$	96,119
Cheverie	"	23,272	"	17,509
Walton.....				
St. Ann's, C. B.....	"	4,300		
Lennox Passage				
Halifax	"	94	"	492
Total	"	123,753		

BUILDING STONE.

Antigonish	Tons.	15	Value.....	\$60
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Amounts exported.

--- HALIFAX.

*Export Statement ; the Produce of the Mine from the Port of Halifax
for the Year Ending 31st December, 1886.*

Article.	Quantity.	Value.
Coal .....Tons.	23,397	\$74,027
Gold.....		373,857
Gypsum.....Tons.	94	492
Coal Oil.....		313
Antimony .....Tons.	645	26,370
Copper Ore..... "	1	160
Manganese "	18½	590
Gold Refuse		150
Salt .....Bush.	43,881	8,308
Stone and Marble.....		195
		<hr/> \$484,462

FINANCIAL STATEMENT.—GOLD.

Mines Department for Twelve Months ended 31st December, 1886.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Totals.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Totals.
Caribou.....	\$114 00	\$879 87	\$993 87	.....	.....	\$33 77	.....	\$33 77
Darr's Hill.....	.....	2644 68	2644 68	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	276 00	.....	276 00	16 00	.....	.....	\$64 25	80 25
Gay's River.....	54 00	.....	54 00	.....	.....	.....	10 00	10 00
Lawrencetown.....	.....	10 95	10 95	.....	.....	.....	.....	.....
Montague.....	64 00	160 87	224 87	.....	.....	.....	.....	.....
Oldham.....	8 00	706 85	714 85	.....	.....	7 69	36 00	43 69
Ovens.....	62 00	1 19	63 19	.....	.....	16 13	.....	16 13
Renfrew.....	204 00	134 48	338 48	.....	.....	6 72	36 00	42 72
Sherbrooke.....	118 00	492 27	610 27	12 00	.....	25 26	446 24	483 50
Stormont.....	338 00	340 88	678 88	22 00	.....	.....	39 50	61 50
Tangier.....	36 00	176 67	212 67	80 00	.....	.....	27 12	107 12
Uniacke.....	.....	225 56	225 56	.....	.....	2 83	97 50	100 33
Waverley.....	12 00	90 61	102 61	8 00	46 60	.....	.....	54 60
Wine Harbor.....	34 00	5 80	39 80	.....	.....	.....	5 50	5 50
Unproclaimed.....	2474 00	2679 48	5153 48	408 00	.....	90 35	545 81	1044 16
Prospecting Licences.....	.....	.....	8896 72	.....	.....	.....	.....	460 51*
	\$3794 00	\$8550 16	\$21240 88	\$546 00	\$46 60	\$182 75	\$1307 92	\$2543 78

*Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1886.

COUNTIES.	RECEIPTS.				EXPENDITURES.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'n Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	\$ 20 00	.....	.....	\$ 20 00	.....	.....	.....
Antigonish	80 00	.....	.....	80 00	.....	.....	.....
Cape Breton	840 00	\$200 00	\$44210 80	45250 80	.....	\$1486 15	\$1486 15
Colchester	100 00	.....	.....	100 00	.....	.....	.....
Cumberland	460 00	50 00	30534 90	31044 90	60 00	472 00	532 00
Digby	20 00	.....	.....	20 00	.....	.....	.....
Guysborough .....	.....	100 00	.....	100 00	.....	.....	.....
Halifax	20 00	.....	.....	20 00	.....	.....	.....
Hants	100 00	.....	.....	100 00	.....	.....	.....
Inverness	160 00	25 00	16 45	201 45	.....	.....	.....
Lunenburg	20 00	.....	.....	20 00	.....	.....	.....
Pictou	940 00	100 00	26894 38	27934 38	.....	483 00	483 00
Richmond	120 00	25 00	.....	145 00	.....	.....	.....
Victoria	100 00	.....	.....	100 00	20 00	.....	20 00
Renewals Coal Leases .....	.....	.....	.....	479 50	.....	.....	.....
Block-house Colliery .....	.....	.....	.....	.....	.....	.....	1338 32
Examinations .....	.....	.....	.....	.....	.....	.....	312 87
	\$2980 00	\$500 00	\$101656 53	\$105616 03	\$80 00	\$2441 15	\$4172 34

ABSTRACT ACCOUNT.

Receipts and Expenditure for the twelve months ended 31st December, 1886.

RECEIPTS.	EXPENDITURE.
Licenses to search Coal \$ 2,980 00	Return Licenses to Search \$ 80 00
" Work Coal 500 00	Salaries and Surveys 2,441 15
Royalty 101,656 53	Block-house Colliery 1,338 32
Renewals Coal Leases 479 50	Examinations 312 87
\$105,616 03	\$4,172 34
Rent—Gold \$3,794 00	Return Rents \$ 546 00
Royalty 8,550 16	" Royalty 46 60
Prospecting Licenses 8,896 72	Royalty Commission 182 75
\$ 21,240 88	Salaries and Surveys 1307 92
	Return Prospecting Licenses 460 51
	\$2,543 78
	General Expenses \$5,453 87
	Law Expenses 445 64
	Postage 158 28
	Stationery and Printing 468 26
	\$6,526 05
	\$13,242 17
	\$126,856 91

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